Indiana Technical College

FORT WAYNE
••INDIANA••

1944-45

INDIANA TECHNICAL COLLEGE · 1930 ·

OFFICERS AND FACULTY

A. T. KEENE, A. B., A. M., President

WM. J. HESS, Vice President
J. J. THEOBALD, Guidance Counsellor
PAUL E. HESS, Secretary
I. M. PONTIUS, Registrar

ACADEMIC COMMITTEE

ROBERT C. RUHL GEORGE F. SCHULTZ IVAN PLANCK

ROBERT C. RUHL, Department of Civil Engineering
Chairman Academic Committee, B.S.C.E., M.S.C.E., Purdue University.

GEORGE F. SCHULTZ, Department of Electrical Engineering
Indiana University; B.S., U. S. Naval Academy; Naval Aviation School; Electrical Officer, USS Lexington; Lieutenant U. S. N. ret.

RICHARD D. DERMER, Department of Radio Engineering
B.S.E.E., Indiana Technical College, formerly with General Electric Company in Testing and Experimental Laboratory.

H. W. G. SALINGER, Instructor in Radio Engineering and Physics
Ph.D., University of Heidelberg; American Ass'n for the Advancement of Science; Institute of Radio Engineers. Formerly Research Engineer Farnsworth Television and Radio Corporation.

ALFRED H. WALBAUM, Department of Chemical Engineering
B.S. Ch. E., Purdue University; Graduate School University of Pennsylvania, Chemical Engineer, Universal Oil Products Co. 1927-1933.

WALDO E. ALBERT, JR., Department of Aeronautical Engineering
Olivet College; B.S.Ae., Indiana Technical College; Engineer, Curtiss Wright Corporation; CAA Primary, Secondary and Instructors' Pilot Certificates; Rated CAA Ground School Instructor.

IVAN PLANCK, Department of Mechanical Engineering
B.Ch.E., B.Sc. in Ed., M.Sc., Ph.D., Ohio State University.

RALPH E. WRIGHT, Instructor of Mathematics
B.S., Mathematics Major, Wheaton College.

ABNER S. TYSON, In charge of Machine Shop Courses.
Drexel Institute; B.S.M.E., Indiana Technical College.

HAROLD TINNAPPEL Department of Mathematics
B.S., Ohio State University.

MERL F. RENZ, Instructor in English
A.B., A.M., University of Toledo; Graduate School Ohio State. University; formerly instructor, Engineering English, Ohio State University, and Asst. Professor of English, West Liberty State Teacher's College.

EARLE R. SAFFEN, Director of Student Welfare
Former Y.M.C.A. secretary; Extension Division George Williams College; American School of Physical Education.

CARLYSLE FRIDDLE, Coach
Franklin College; special coaching courses; University of Illinois.


PYRAMID CLUB

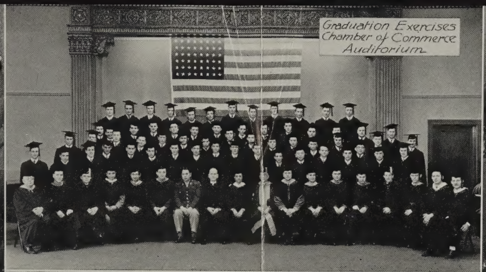

RIFLE CLUB


ALPHA GAMMA UPSILON

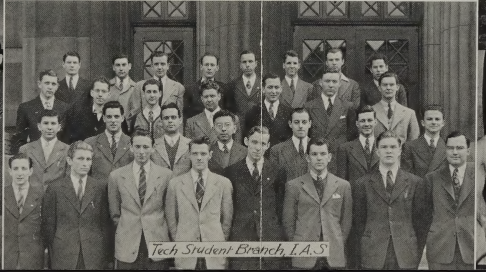

Student Ass'n, Fort Wayne Section, A.S.M.E.


WATER POLO


STUDENT COUNCIL


Graduation Exercises Chamber of Commerce Auditorium


INDIANA TECHNICAL COLLEGE FACULTY AND SENIORS —1943—

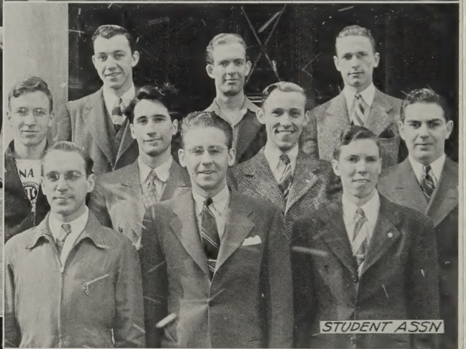

Tech Student Branch, I.A.S.


X.E.T.


BOWLING TEAM


BASKETBALL


TECHNICIAN STAFF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IOTA TAU KAPPA

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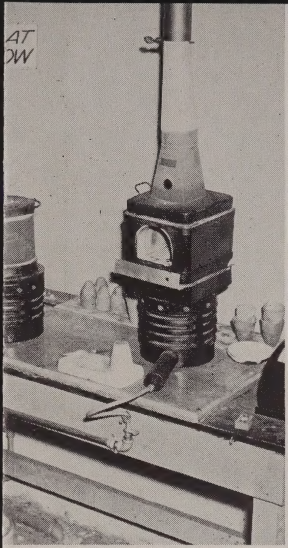

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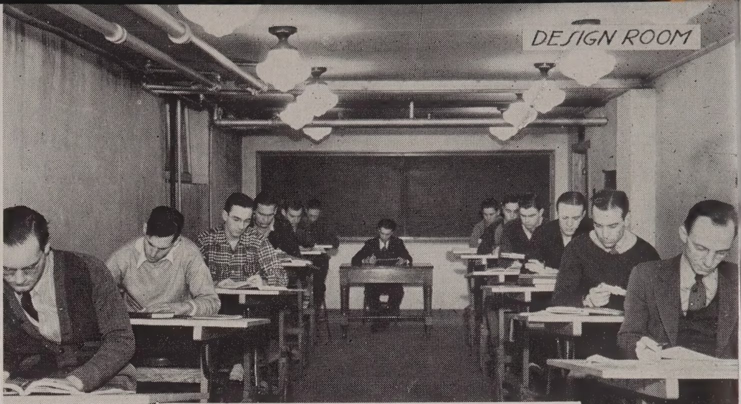
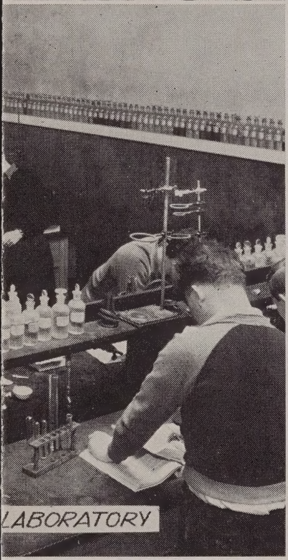


DESIGN ROOM

RADIO CODE



LABORATORY

LECTURE ROOM

MICAL

ENGINEERING DRAWING CLASS

VIEWS AT INDIANA TECHNICAL COLLEGE

W9BHR

DIESEL TESTING ASSEMBLY

PLANER

PRATT & WHITNEY ENGINE

PRESIDENT KEENE (left) AND GROUP AT THE MUNICIPAL AIRPORT

FIRE ASSAY EXHIBIT AT TECH ANNUAL SHOW

DESIGN ROOM

CEMENT TESTING

FIELD WORK IN SURVEYING

WIND TUNNEL POWER UNIT

RADIO CODE

RADIO LABORATORY

MILLING MACHINE

WIND TUNNEL BALANCE AND COMPUTING ROOM

CHEMICAL LABORATORY

LECTURE ROOM

MAIN SWITCHBOARD

VIEW THROUGH TEST SECTION OF WIND TUNNEL

PROPELLER UNIT OF WIND TUNNEL

ELECTRICAL LABORATORY

X-RAY TESTING LABORATORY

CLASS IN MATHEMATICS

MODEL MOUNTED FOR WIND TUNNEL TESTING

DISPLAY IN AERONAUTICAL LABORATORY

CORNER OF CHEMICAL SUPPLY ROOM

ENGINEERING DRAWING CLASS

INDIANA TECHNICAL COLLEGE

Aeronautical Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Mechanical Engineering
Radio Engineering

AND

Vocational Courses in Radio and in Mechanical Drafting

See Page 5 for School Calendar

221-223-225 E. Washington Blvd
Opposite Y. M. C. A.
FORT WAYNE, INDIANA

Origin and Ideals

In 1930, John A. Kalbfleisch, former school executive and director, and William J. Hess, of extensive financial and manufacturing experience, with consulting engineers and educators, organized Indiana Technical College.

Among the many technical and mechanical industries of Fort Wayne there had long been a growing demand for capable technical men and engineers. This demand called for men with thoroughly practical, yet sound scientific and engineering education and training.

It seemed that the way to meet the demand was to focus the entire educational effort of a well-equipped, well-organized and efficiently managed school on the technical subject-matter and knowledge which the young engineer needs to have fresh in mind, first and last, not only to secure and hold a position, but also to win a commanding position in his profession.

Therefore, it was decided that the educational policy and ideal of Indiana Technical College should be one of strong concentration on mathematics, science, and engineering subjects. It was held to be sound policy, entirely in harmony with a fast-growing age demanding RESULTS, to stick to one kind of learning instead of dividing the student's attention by asking him to study also at the same time the many non-technical subjects generally interwoven into the conventional engineering program.

Consequently all of the non-technical subjects, except practical and useful English, modern economics, and business and engineering applications of law, were omitted. It was also realized that an intense, practical and thorough program of technical subjects would appeal strongly to the man with an engineering bent of mind, but consequently with little or no leaning to the so-called liberal arts content of education.

Finally, Indiana Technical College frankly had in mind the ambitious and capable young man who lacked the $700 to $1200 per academic year to see him through a four-year program of education. It seeks to make it possible for this deserving young man to get by, if necessary, on an amount from $350 to $450 for the school year of TWELVE MONTHS and so to realize his right to enter the engineering profession along with his brother who happened to be born in more fortunate circumstances.

Following is an excerpt from a letter touching on this very point, from Chauncey R. McAnlis, City Engineer of Fort Wayne, and former instructor in engineering subjects in the University of Illinois and at Cornell:

> **Your plan of covering the technical requirements in 24 months by omitting many of the non-technical subjects has been of great interest to me and should interest these days most young men who want to be up and doing.**
>
> Furthermore, you open a fine opportunity to the young man who must save time and money. He can come to your school, and by earning some of his personal expenses, as is possible in a city like Fort Wayne, he can secure a professional training as well as his more fortunate brother, who, though he has plenty of money

behind him, may never learn the lesson of self-reliance which is such a necessary qualification in making good.

INDIANA TECH students have a decided advantage over those who attend schools in small towns. In a technical and industrial center like Fort Wayne, they can make many inspection trips and see exactly what will be required of them later after they have graduated and are ready for work.

Status of Indiana Technical College

Indiana Technical College is incorporated under the laws of the State of Indiana, and so is authorized to conduct courses in technical and engineering education as outlined and described in this catalog. Like any other successful business, it exists by giving satisfactory service to its patrons. It has no connection with any other school. As to its standing and financial responsibility, Indiana Technical College refers prospective students to any bank in Fort Wayne, the Chamber of Commerce, the city officials, ministers, the Y. M. C. A., the Community Center, the Superintendent of Schools, and to the heads of the city's commercial and manufacturing concerns.

Progress

That the policies and principles underlying the Indiana Technical College system of training and education for the engineering field are correctly planned and related, is verified by the judgment of the increasing number of students who are choosing TECH as their alma mater. Although many students are forced to attend terms alternately with time taken out to earn tuition, the fact that they return to their studies shows that they appreciate the treatment received at Indiana Technical College.

Personnel Department

Employers show a ready courtesy to TECH graduates, for they are making good under the requirements of state, institutional, and industrial service.

In order to acquaint employers with the special abilities and qualifications of graduates, a PERSONNEL Department has been organized. It is most strongly to a student's advantage to make a record in his studies such that there may be no hesitancy on the part of the Department in recommending him whole-heartedly and enthusiastically. After all, the extent of the service which this Department is able to render to the student is measured by the reputation and record he has made.

Every graduate of Indiana Technical College is automatically entitled to permanent registration with the Personnel Department which maintains a complete record of his ability as shown by his grades, of his general conduct, and of his impressions on his instructors and on his fellow students.

Recently this Department has had more opportunities referred to it than there were graduates available for placement. Representatives of firms like International Business Machines, Inc., Chrysler Institute of Engineering, Delco Radio Corporation, Indiana Service Corporation, and the General Electric Company have visited the college to interview graduates as applicants for positions.

Many Opportunities in Fort Wayne for Students' Inspection Trips

International Harvester's truck manufacturing division, the great mid-western plant of the General Electric, specializing in small motors, electric meters, transformers, radios, refrigerators and air-conditioning equipment; Bowser, Wayne Tank and Tokheim plants pioneering in gas and oil tanks, filling-station equipment, water softeners and oil burners; Magnavox and Inca loud speakers and radio sundries; Bass car-wheels, castings, grey iron tanks and forgings; American steel dredges, oil barges and sectional steel hulls are industrial terms constantly heard in Fort Wayne.

Students go on frequent inspection study trips to the outstanding industries to see first hand the industrial application of mechanical, electrical, and chemical principles. TECH students are welcome and their visits are made interesting and profitable. The widely diversified industries of Fort Wayne offer splendid employment opportunities to Tech graduates. Indiana Service Corp., Tokheim, General Electric, Minnesota Oil Paint Co., Magnavox, and City Light & Power Co. are among employers of Tech graduates.

Here is a partial list of Fort Wayne products:

Agricultural machinery
Air pumps
Batteries and plates
Belting
Beverages
Boilers
Brass foundry products
Brick
Carwheels
Castings
Chemists' supplies
Coal stokers
Concentrating tables
Clothing
Cooperage
Dredges
Electrical
  appliances
  generators
  meters
  motors
  refrigerators
  transformers
Engineering supplies
Feed
Fertilizer
Fishing tackle
Foundry products
Forgings
Furniture
Fuel oil
Hosiery
Gas manufacturing machinery
Hoisting and lifting machinery
Jewelry
Lamp bulbs
Machinists' tools
Mattresses
Mosaics
Oil Burners
Paints
Paperboard
Paper products
Patterns
Petroleum products
Public address systems
Roadbuilding machinery
Radios
Sewer pipe
Steel dump bodies
Structural steel
Sugar
Tanks
Tile
Trucks
Varnishes
Water softeners
Washers and ironers

In addition to its many technical and industrial activities Fort Wayne is a most refined, modern and beautiful city in which to live. The population is 135,000, and the city has:

725 Acres of Parks	**21 Theaters**	**7 Banks**
77 Churches	**82 Fraternal orders**	**5 Railroads**
46 Public Schools	**14 Commercial clubs**	**2 Airports**
26 Parochial Schools	**11 Libraries**	**2 Broadcast stations**

Library and Reference Advantages

The College Library and Reading Room specializes in technical books and magazines for direct classroom reference. Volumes may be withdrawn for limited periods.

The Public Library of Fort Wayne and Allen County, corner of Webster and Wayne Streets, four blocks from the College, houses over 220,000 volumes of catalogued books, over 7,000 other books, and 2,200 volumes of bound magazines. Like the General Sections, the Business and Technical Section is equipped with comfortable reading rooms. It has over 8,000 volumes catalogued, and over 200 current technical and business magazines on file.

The library is a designated Depository Library of the Federal Government and receives Federal Publications as printed and distributed by the Superintendent of Documents of the United States Government Printing Office.

General Information

SESSIONS

Sessions are held the year around. Four terms of TWELVE WEEKS each make up the academic year, leaving approximately four weeks for work, travel or vacation. Students may attend the year around or alternate terms, as most convenient. The customary holidays are observed. Opening and closing dates of terms are listed on the following calendar:

Spring Term: March 6, 1944 - May 26, 1944.
Summer Term: June 5, 1944 - August 25, 1944.
Fall Term: September 5, 1944 - November 24, 1944.
Winter Term: November 27, 1944 - March 2, 1945.
Christmas Vacation: December 20, 1944 - January 4, 1945.
Spring Term: March 5, 1945 - May 25, 1945.
Summer Term: June 4, 1945 - August 24, 1945.
Fall Term: September 4, 1945 - November 23, 1945.
Winter Term: November 26, 1945 - February 22, 1946.

CLASS PERIODS AND CREDIT HOURS

Terms are 12 weeks long. There are no classes on Saturday. The daily schedule runs from 7:55 A.M. to 5:15 P.M. with 70 minutes for the luncheon hour. Classes meet every 50 minutes. Usually a student will have classes and laboratory periods during one-third to one-half the daily schedule. He may study in the college classrooms, reading room, or at his room.

In a subject like Mathematics I (College Algebra) the class meets five times a week, therefore the credit is 5 term hours toward graduation. In a subject like Engineering Drawing I the student spends three 50-minute periods in the drawing room for each credit hour. It is the general rule that three periods of laboratory or drawing room work are the equivalent of one period of class work plus outside preparation.

ENTRANCE (Important)

Admission should be arranged for well before the opening date of the term. In order that the necessary preparations for the reception of the student may be made for his first term, including selecting and reserving suitable rooms; ordering textbooks well in advance, so that no delay may occur; and the planning of part-time work when necessary; it stands to reason that the officials of the College deserve sufficient advance notice to have a fair chance to make good with the student.

ADMISSION

By presenting entrance credentials, paying tuition and laboratory fees, determining class schedules of subjects, enrollment in classes, and procuring textbooks, admission is completed.

ENTRANCE REQUIREMENTS

Graduation from a standard four-year high-school course is recommended, the student having earned thirty-two credits or sixteen units. To stick too blindly, however, to such a requirement might deprive some fine and substantial young man of the free right to serve in his chosen profession.

From the College's past experience with several carefully observed examples, it is evident that there are young men who, unfortunately or otherwise, were deprived of a complete high school education, but, nevertheless, because of maturity and practical experience, may become most able and loyal students and successful technical men and engineers. To penalize such men for lack of early opportunity to go to school would be manifestly unjust. They will receive cooperation and encouragement at Indiana Tech.

SCHOLASTIC STANDING

Students who lack technical entrance credits, lack full scholastic standing until such deficiencies are removed. The same is true of any student in advanced subjects while a failure or a condition remains on his record.

PREPARATORY DEPARTMENT

Classes in preparatory mathematics and science are in constant session in this Department. Due to delayed choice of fitting subjects in high school, or because of high schools not offering all required prerequisites for an engineering education, the high-school graduate is not always prepared to take up every subject in the freshman term of his engineering course. Inasmuch as algebra is usually given in the freshman and junior years of high school, the student often loses some of his facility in algebraic processes, and can profit very greatly from a review.

The student who has not completed high school, but who has, through maturity and experience, acquired a certain firmness of purpose, can readily make up credits in the Preparatory Department. Often such make-up work or review can be absorbed without loss of time in the long run in the student's course.

Tuition, Books and Fees

Due to increasing costs, tuition will be $65 per term until further notice.

Books and fees for the freshman for the first term approximate $19.75.

Students taking preparatory chemistry and algebra pay $16.60 instead of $19.75. Many textbooks are used for two or three terms. For instance, the ones for engineering drawing and college chemistry are used three and two terms, respectively. Furthermore, used books may be available whereby some saving is possible. The college bookstore does not handle used books but students sell books to each other.

At present a drawing outfit is obtainable for $21.00 but we cannot guarantee this price indefinitely.

NO EXTRA CHARGES FOR PREPARATORY WORK

It was an original principle with Indiana Tech that every student should be encouraged to be THOROUGH in his studies. Therefore, no added charge is made for a reasonable amount of preparatory work.

ADVANCED STANDING

Upon the presentation of a satisfactory statement of credits and marks from a reputable school, in subjects duplicating any contained in the course contemplated by the prospective student, advanced standing is granted. By arrangement with the Academic Committee examinations for advanced standing may be taken, the fee being $2 per credit hour.

ATTENDANCE

Regular and prompt attendance, thorough lesson preparation, constructive and alert classroom attitude, and gentlemanly conduct are expected. It is not felt that very much of the time of the Instructors is to be spent in admonishing students as to their studies.

The recommendation of the College is rapidly increasing in value as its graduates make reputations for professional ability and conduct. It is desired that every student set himself an ideal to earn the sincere and unqualified endorsement of the Personnel and Employment Department for punctuality and reliability.

Absences are permissible for legitimate participation and extra-curricular activities, or in field and inspection trips under supervision of the Faculty. Unless such absences are arranged for by previous authorized sanction, special arrangements must be made in advance of the intended absence.

The faculty reserves the privilege to require extra credit hours from students whose attendance is faulty to the extent of preventing their doing creditable work.

MARKING SYSTEMS

Marks range from "A" for superior classroom work, to "B" for very satisfactory work, to "C" for good work, to "D" for passing, "I", incomplete, "E", conditional, "W" authorized withdrawal, and "F", failure.

One transcript of credit is furnished to graduates without charge; additional copies, $1 each.

TUITION

Tuition is $65 per term, and is unconditionally payable upon admission. Special discounts are in effect for the payment of more than one term's tuition at the same time.

TRANSFER OR REFUND OF TUITION

Unused tuition may be transferred to one not already an enrolled student. A student who is permanently incapacitated from attending school because of illness will receive a refund of 80% of the pro rata remaining paid-up tuition. Registration fee to the amount of $10 is not subject to refund.

LABORATORY FEES

Laboratory fees are based on the bare minimum of ordinarily used materials at cost price. Students are entirely responsible for laboratory apparatus as well as for other school property used by them. A One Dollar breakage fee deposit is required in some courses, subject, however, to refund of the amount remaining in excess of actual damage.

General lab fees, however, are not subject to refund.

TEXTBOOK AND SUPPLIES

The best of the standard texts in their fields, according to the judgment of the Faculty, are chosen from time to time. Under Description of Courses, beginning on page 35, the names of the texts and their authors are included with the outline of college subjects. Books and supplies are obtainable at the College Book Store at list prices. Terms are CASH.

The Book Store does not seek to deal in used books, and cannot take orders to reserve them, but sometimes has them on hand at bargain prices. Ordinarily the demand for used books greatly exceeds the supply. Consequently a student will have ample opportunity to sell his own books, if he wants to.

Students estimate that they have reclaimed 50% to 60% of the cost of books throughout their courses by selling their used books.

An approved drawing outfit is obtainable at the College Book Store.

ROOMS AND BOARD

Approved private homes offering rooms at from $2.50 to $3.50 per week abound within five to fifteen minutes' walk of the College. Prices vary somewhat with supply and demand, but early registration will assure the student of securing almost exactly what he wants.

Board, room and laundry have been obtained at from $8.50 to $10.00 per week.

Y. M. C. A.

The Y is opposite the College. Rates for students range from $2.75 for double rooms to $3.50 for single rooms.

The Y rate is a special concession to Tech students, and also includes the privilege of reading rooms, gym, swimming pool, showers, volley and net ball, and supervised athletics. The Y serves wholesome food at reasonable prices.

PART-TIME WORK

Most Tech students, sometimes as many as 80%, earn board. After they have been here long enough to get well settled into their studies and to get acquainted in the city, some earn nearly all of their personal expenses.

Such matters are entirely up to the student's ability, personality and industry. Quite naturally, the student's classroom load must be adjusted accordingly, if he wants to do an unusual amount of outside work.

STUDENT WELFARE DIRECTOR

The Student Welfare Director assists students in finding board, room, and part-time work.

Usually he is able to place all beginning students within a reasonable time after their arrival, if not at once. Obviously it is an advantage to enroll early enough so that the student's arrival may be definitely anticipated in the Welfare Director's plans.

It is an advantage to the student entering for the Fall or Winter Term who must earn some of his living expenses immediately, to arrive in Fort Wayne ten days to two weeks before registration. By this plan he may have the personal attention of the Welfare Director and the office staff in becoming satisfactorily situated before the rush of the opening days of the term.

A blank to be filled out for the Welfare Director accompanies the letter from the President, or will be sent when the student's registration is received. Filling out this blank will provide the Welfare Director with valuable information as to the student's past experience for use in plans for part-time work. A simple form of a health-medical record is also provided which should be on file before the student registers for classes.

CONVOCATION

Students assemble for Convocation every two weeks. Programs vary. Frequently there are addresses on technical and industrial subjects. Prominent engineers passing through Fort Wayne are available for addresses.

Dr. Saul Dushman, Assistant Director, G. E. Experimental Laboratories, Schenectady; Dr. John J. Caton, Educational Director, Chrysler Corporation, Detroit; Lt. Wm. Potts, Detroit Police Department, inventor of the traffic light and originator of the police radio system; R. N. Harmon, Chief Engineer, Radio Division, Westinghouse Electrical & Manufacturing Co., and Arthur H. Halloran, author and former radio magazine editor, now associated with the Farnsworth Television and Radio Corporation of Fort Wayne, have addressed Tech Convocations.

CHURCH ATTENDANCE

The college expects its students to affiliate themselves with one of the numerous downtown churches. The student who has been used to attending church at home should not discontinue his devotion because he has gone to live in another city.

MUSIC

Students are aided and encouraged to organize quartets, glee clubs, choruses or orchestras, depending upon talent and interest.

TECHNICIAN

The TECHNICIAN, the official school paper, is published by the Technician staff under the supervision of the student council. The paper features general and departmental news, an alumni department, and timely technical articles.

ATHLETICS

Opportunity exists for participation in competitive athletics in leagues fostered by the college, the Y. M. C. A., and the Community Center in basketball, soft-ball and water polo. The college "letter" is awarded for special merit in these sports.

INDIANA-OHIO CONFERENCE

The Indiana-Ohio Conference, of which Indiana Technical College is a member, is composed of colleges in Indiana and Ohio with the prime purpose of promoting intercollegiate basketball.

STUDENT COUNCIL

The Student Council is the general representative organization of the student body. Through ample representation from each department, it exercises advisory control of all student activities from functions in connection with the faculty for the general welfare of the college.

TECH STUDENT ASSOCIATION

The Tech Student Association, operating as a working arm of the Council, has direct control of planning and supporting student activities. Its officers are elected at the beginning of each term.

FRATERNITIES

Iota Tau Kappa, honorary scholastic fraternity, was organized in 1943 to give recognition for superior scholarship.

Beta Chapter of the national fraternity Alpha Gamma Upsilon was transferred to Indiana Technical College April 16, 1932. Pledges are eligible for initiation after one term's attendance.

Nu Chapter of Phi Iota Alpha was installed at Indiana Technical College November 16, 1939. This fraternity has the special purpose of fostering close relationship among Latin-American students.

TECH BRANCH, FORT WAYNE SECTION, A. I. E. E.

Tech students who have completed sixty hours of college work, including fifteen hours of Electrical Engineering are eligible for membership. Programs of interest to students are furthered by this organization.

X. E. T.

The membership is composed of men with a deep interest in chemical engineering who wish to preserve a fraternal relationship in and out of college.

STUDENT ASSOCIATION, FORT WAYNE SECTION, A. S. M. E.

This organization is for students of the Mechanical Engineering Department. Its ideals are both scholastic and social. Programs frequently include talks by experienced engineers.

STUDENT BRANCH, INSTITUTE OF THE AERONAUTICAL SCIENCES

This organization is composed of students of the Aeronautical Engineering Department with the general purpose of broadening their knowledge in their field. Membership includes the privileges of the Paul Kollsman Library of Aeronautical Books.

TECH RIFLE CLUB

This organization welcomes to membership students who are interested in rifle shooting. Matches are conducted under rules of The National Rifle Association.

PYRAMID CLUB

Membership is open to students of the Civil Engineering Department. The purpose of this organization is the study of problems in the civil engineering field.

TECHNICAL AMATEUR RADIO CLUB OF FORT WAYNE

Membership composed of students of the Radio Engineering Department who are especially interested in amateur activity—transmission, reception, experimentation and fellowship. The group organized and successfully conducted the first Central States Hamfest.

ANNUAL EXHIBIT

The Tech Annual Exhibit is held early in May of each year. Suitable awards and prizes are offered for the best individual and departmental displays of students' work and exhibits. The exhibit is the source of great interest to the public of Fort Wayne and vicinity.

AWARDS AND TROPHIES

The Kalbfleisch Memorial Scholarship, provided by Mrs. Carl H. Pierson in memory of the late J. A. Kalbfleisch, first President of Indiana Technical College, is awarded to a student of excellent character who gives promise of outstanding ability. The award is made by Mrs. Pierson, Dr. Paul H. Krauss, Pastor, Trinity English Lutheran Church, and President Archie T. Keene.

The Hess Award for departmental excellence in annual exhibits is presented by William J. Hess, Chairman, Board of Directors.

The Caswell Trophy for excellence in Engineering Drawing is presented by William Henry Caswell, Detroit, Michigan.

Alpha Gamma Upsilon Fraternity presents a cash award each term to the student with highest scholarship, and further honors such student by engraving his name on the Fraternity Honor Plaque.

Letters, keys, medals and pins are awarded to students for meritorious service in school activities.

TRAVEL SERVICE

Students desiring transportation service may arrange for traveling itinerary and bus service, including rates and schedule, through the Student Welfare Department.

REPORTS ON STUDENTS' PROGRESS

Reports are made to parents and guardians of the grades for each term's work. When requested, or when it seems to the immediate best interests of all concerned, special reports are made after midterm examinations.

The Faculty earnestly solicits the cooperation of parents and guardians for the best methods of promoting the student's progress.

ANNUAL FORMAL COMMENCEMENT

Annually, at the close of the Spring Term formal graduation exercises and the baccalaureate service are held for all students completing their prescribed courses during the year.

Students who finish during the Summer, Fall, or Winter term receive their diplomas at the end of that term, and return to participate in the formal activities of the closing week program, the latter part of May.

The Annual Commencement address is delivered by a noteworthy man. Recent speakers include Dr. James S. Thomas, President, Clarkson College of Technology; Dr. John J. Caton, Dean, Chrysler Institute of Engineering; William H. Caswell, attorney of Detroit; Dr. Henry Hitt Crane, lecturer, traveler and author; Dr. Merton S. Rice, noted lecturer; and Ernest J. Gallmeyer, Vice-President, The Wayne Pump Co., and Major L. R. Kavanaugh, U. S. A.

A special part of the Commencement program is given in honor of students who have won recognition of merit in scholarship or special distinction in a college enterprise.

Requirements for Bachelor of Science Degree

1. The candidate must be of good character and reputation.
2. He must have earned the required number of term hours of credit and be in full scholastic standing.
3. He must have earned required grades in special and major subjects.
4. All obligations due the college must be paid.

REVISIONS AND CHANGES

The right is reserved to make such changes as are advisable in the provisions of this catalog.

Bachelor of Science Degree Courses

The courses in Electrical, Civil, Chemical, Radio and Television, Aeronautical, and Mechanical Engineering compare favorably in technical hourage with those offered in four-year schools.

All contain the standard program of six terms of mathematics, from College Algebra to advanced Calculus, using standard college textbooks. All of these courses include the three standard terms of Engineering Drawing, using French's ENGINEERING DRAWING, a standard college and university textbook.

The general sciences of chemistry and physics round out the basic foundation of all courses, except in the vocational Radio Courses in which Code 1, 2, and 3, are pursued intensively. The courses in code will help the student to qualify for the Federal Communications Commission operators' license examinations. Those particularly interested should write for the pamphlet, "Rules Governing Operator Licenses," addressing the Commission at Washington, D. C.

The two terms of College English seek to give the student a clear and correct command of general and technical writing and speech. The textbooks, with supplementary exercises, stress actual English usage for engineers. The studies in Economics and of the applications of Law to contracts and other legal responsibilities peculiar to engineering and business relationships are planned to give the engineer the practical viewpoint of the legal and business sides of his profession.

The remaining subjects in each course relate to the requirements of each special field. For instance, the Civil Engineer becomes familiar with surveying; the computation of stresses and strains, and of the strength of materials; the uses of concrete; the problems of highway, municipal, sanitary, hydraulic, structural, and railway engineering; the field of bridge design, etc. On the other hand, the Electrical Engineer studies direct and alternating, and polyphase currents; electrical generator units and power stations, electrical machine design, a summary of electrical measurements; and the field of industrial applications and its requirements.

Vocational Diploma Courses

The man who cannot, for the present, see his way clear to devoting twenty-seven months to an engineering and technical training, may find what he wants in the Mechanical Drafting course, outlined on page 30, or he may take the one-year Radio course outlined on page 34.

Most of the subject-matter contained in the Drafting course commands college credit and may be utilized later toward earning the B.S. degree, as well as qualifying for strong positions in Drafting for the present.

Combined Courses Save Time for Two Degrees

Frequently, specialized knowledge in related fields of engineering offers to graduates trained in them, attractive opportunities for advancement not otherwise possible. Then, too, many students of engineering have an equally strong desire to specialize in two branches.

Such students may earn two degrees from the respective departments of Aeronautical, Chemical, Civil, Electrical, Mechanical and Radio Engineering by the combination of courses in any two, with a saving of four, five, or six terms.

Each department contains numerous courses common to all. For example, the regular program in mathematics offers six terms of classwork in each of the departments. Likewise, English I and II; Engineering Drawing I, II and III; Engineering Law or Economics; Physics 11, 21 and 31; and Chemistry I and IA are common requirements in all courses.

The time saved in earning two degrees is largely dependent upon the combination chosen between two departments. A student completing the requirements for the degree B.S.Ae.E. may also earn the degree B.S.M.E. by meeting the requirements of 56 additional term hours, from the Mechanical course, or the equivalent of three terms. This combination, therefore, enables a candidate to save five terms.

Candidates for the degree B.S.Ch.E. may also receive the B.S. degree in M.E., E.E., or C.E., by the addition respectively, of approximately four terms.

A saving of four terms is also possible in receiving the degree B.S.Ae.E., or B.S.M.E., by a student earning the degree B.S.C.E.

Further, a saving of time may be made in completing the requirements for the degree B.S.R.E., or B.S.M.E., while earning the degree B.S.E.E.

Other combinations are possible for students who wish to complete the requirements for two degrees. Full details in regard to combination courses can be obtained from the heads of the respective departments concerned.

Because of the sequence of courses extending over a period of terms, it is an advantage to the student to make his choice as early as possible, preferably by the beginning of his second term.

The tuition rates for the combined courses leading to more than one degree are the same as those charged in any of the regular courses.

Aeronautical Engineering

Aeronautical Engineering has assumed a definitely important place in present-day manufacturing, transportation, and communication. The course offered at Indiana Technical College makes possible a career in design and production of heavier-than-air machines, the development of airports, aircraft operation, and the administration of airways.

Aeronautical subjects proper are attempted only after the student is well-grounded in the fundamentals of mathematics, engineering drawing and general science. This sequence of subjects carries the student logically and smoothly upward through general engineering requisites into aeronautical problems.

The course offers a broad scope of fifty-eight term hours in aeronautical engineering subjects—Aeronautical Engineering, Aerodynamics, Internal Combustion Engines, Airplane Design, Stress Analysis, Propeller Design, Meterology and Avigation and Aerostatics—a specialization equalled in few courses in this field. Students cover not only the various phases of the field, but also complete individually accurate calculations and tests on airplane performance and stability. They learn the various types of designs and carry through a complete design and stress analysis of a plane, including propellers and limited details according to the specifications of the U. S. Department of Commerce and other governmental authorities.

A Swiftly Developing Field

Development of aircraft in recent years has been amazing. 3,768,89 passengers were carried in 1941. The demand for men capable of designing and inspecting aircraft production is potentially unlimited. The well-trained Aeronautical Engineer may specialize in propeller design, airplane design, airplane production, airplane stress analysis, airport management, traffic management, and executive duties. The recent adoption by automotive manufacturers of streamline design emphasizes the importance of the study of air currents and forces disclosed in wind-tunnel laboratory experiments.

No more alluring field than that of Aeronautical Engineering is opening up before the man who is ambitious and who seeks broad and interesting opportunities.

The course does not include flying instructions. Training in flight is advisable in the advanced terms of the course for those who are interested. Such instruction is available at the local airports from licensed pilots at very reasonable rates.

The College is rated and certificated for controlled ground school courses by the Civil Aeronautics Authority.

LABORATORY EQUIPMENT AND EXPERIMENTATION

Practical integration of the course is effected by laboratory work in the technic of the various phases of testing airplane design. Wind-tunnel tests determine full scale performance of stability, maneuverability, and desirability of new planes before construction is ever attempted. Tests include the following:

Investigation of the airflow about a cylinder, streamline strut and airfoil section;

Calibration of an inclined tube manometer and its application with a Pitot-static tube;

Investigation of the sensitivity of a Pitot-static tube to misalignment in yaw, for angles up to 25 degrees;

Pressure distribution along the rib of a standard wing section, with and without a trailing edge flap at various angles;

Aerodynamic characteristics of a modern wing, with and without trailing edge flap;

Aerodynamic characteristics of a complete airplane model;

Investigation of the resistance of a radial aircooled engine;

Investigation of parasite drag;

Measuring the angle of downwash behind a wing;

Investigation of the rolling and yawing moments of an airplane;

Longitudinal stability characteristics of an airplane;

Hot wire anemometer;

Determination of overall wind-tunnel efficiency;

Calculation of the performance of a full-scale airplane from data obtained from wind-tunnel tests of a model; and

Calibration of a channel gauge in connection with the wind tunnel.

The new wind-tunnel was designed for complete classroom instruction as well as for commercial testing. The plans were carefully studied by a former member of the National Advisory Committee for Aeronautics, and his revisions and suggestions were adopted. The tunnel is of the modern return-flow, atmospheric type with semi-elliptical air passage.

Overall dimensions are 33½′ x 18½′, the axes of the test section being 3′10″ and 2′8″ respectively. A 60 h.p. generator-D.C. motor combination driving a 7-foot propeller is designed to furnish air-speeds well over 100 m.p.h. The three-balance arm, suspension type of balance for holding models is suitable for accuracy and instruction purposes.

A modern high-power radial aircraft engine, propellor and a set of cut away engine parts, instruments, and plane are available for study and inspection. Excellent facilities for airport inspection and traffic study are open at Fort Wayne's two airports.

All available reports on past and current experimentation from the National Advisory Committee for Aeronautics, the U. S. Department of Commerce, including reports from foreign governments, are on file.

COURSE IN AERONAUTICAL ENGINEERING

(Detailed description of Aeronautical courses on pp. 37-38)

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

Cat.	No.	Subject	Cr. Hrs.
M	2	Trigonometry	5
Engl	2	English II	5
Ch	2	General Chemistry II	5
Ch	2A	Gen. Chem. Lab. 2A	2
ED	2	Engineering Drawing II	2
			19

Term III

Cat.	No.	Subject	Cr. Hrs.
M	3	Analytic Geometry	5
Ph	31	Heat, Light and Sound	5
AeE	1	Principles of Aeronautics	3
ED	3	Engineering Drawing III	2
Law	1	Engineering Law	5
			20

Term IV

Cat.	No.	Subject	Cr. Hrs.
M	4	Differential Calculus	5
Ph	21	Statics and Dynamics	5
ED	10	Descriptive Geometry	3
AeE	2	Aerodynamics I	5
AeE	2A	Aerodynamics Lab. 1A	2
			20

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
Ph	11	Electricity and Magnetism	5
AeE	6	Meteorology and Avigation	3
AeE	3	Aerodynamics II	5
AeE	3A	Aerodynamics Lab. 2A	2
			20

Term VI

Cat.	No.	Subject	Cr. Hrs.
M	6	Calculus	5
SM	1	Strength of Materials I	5
AM	1	Applied Mechanics I	5
AeE	4	Aerodynamics III	5
AeE	4A	Aerodynamics Lab. 3A	2
			22

Term VII

Cat.	No.	Subject	Cr. Hrs.
SM	2	Strength of Materials II	5
AM	2	Applied Mechanics II	5
AeE	8	Airplane Design I	5
AeE	8A	Airplane Design Lab. 1A	5
AeE	20	Airports and Airways	2
			22

Term VIII

Cat.	No.	Subject	Cr. Hrs.
EE	10	Elements of Electrical Engineering	5
ME	20	Thermodynamics I	5
AeE	11	Seaplane Design	3
AeE	11A	Seaplane Design Lab.	3
AeE	7	Propeller Design	2
AeE	7A	Propeller Design Lab.	2
			20

Term IX

Cat.	No.	Subject	Cr. Hrs.
ME	30	Internal Combustion Engines	5
ME	10	Mechanism	5
AeE	9	Airplane Design II	5
AeE	9A	Airplane Design Lab. 2A	5
			20

Nine-term Course (27 Months)—182 Credit Hours

The Field of Chemical Engineering

The course in Chemical Engineering includes the usual thorough grounding in mathematics, physics and chemistry, in addition to carefully selected subjects in the fields of civil, electrical and mechanical engineering.

Because the applications of chemistry are so numerous and diversified, even the most casual examination will reveal the fact that virtually all industries in some stage of processing, development, or manufacturing, must depend directly upon men with a knowledge of Chemistry. This has given rise to specialization in the field of Chemical Engineering, so that there are today highly specialized and diversified fields, such as Metallurgical Engineering, Gas Engineering, Petroleum Engineering, Ceramics Engineering, and various others. However, all of these fields are nothing more than offshoots from the parent, Chemical Engineering, which, therefore, still retains its major importance.

The Chemical Engineer is likely to find himself in most any industry requiring a knowledge of chemistry, but he may also be required to carry a project through any of its major stages of development. He is likely to have to determine the correctness of the scientific principles underlying some proposed process through actual laboratory experimentation. This requires that he have a thorough knowledge of the basic principles of chemistry.

Having verified the correctness of the scientific principles involved, he may be required to determine the most suitable operating conditions. Here again a sound technical foundation is essential.

Or, the problem may be one of designing a suitable plant, which in turn requires a knowledge of engineering materials, and of their practical aspect of design. Again, he may be called upon to solve the numerous problems involved in the operation of a commercial plant, in which case the chemical engineer may be the superintendent, or a departmental technical executive.

These facts are further illustrated by an examination of positions held by recent graduates, which reveals them to be employed in such highly diversified industries as paint manufacture, air conditioning, rubber manufacture, petroleum technology and metallurgy.

Realizing the importance of chemistry to the Chemical Engineer, General Chemistry I is approached from the quantitative, mathematical, and theoretical point of view, rather than from the descriptive point of view usually emphasized. Since the Chemical Engineer here meets for the first time those basic principles which weave their way all through chemistry and chemical engineering, regardless of how far advanced it may be, great care is exercised to ground him firmly and correctly in these principles.

As the student progresses he is encouraged more and more to think and work out problems for himself. Consequently, he gains confidence in himself, and is gradually, yet surely, brought face to face with the very type of problems he is likely to meet later in actual practice.

Electives

Opportunity is provided by electives for specialization along definite chemical engineering lines. By proper choice of electives the student may in nine terms complete an option in:

(1) General Chemical Engineering
(2) Petroleum Engineering
(3) Metallurgy
(4) Rubber and Plastics

Or, by one additional term's work include all electives. These options have been selected not only because of the need of industry for men who possess both a broad general background and also specialized training, but also because many students demand them. In these courses, therefore, the student is given an opportunity to prepare himself adequately for special industrial requirements.

Laboratory Development

The laboratories contain complete and ample equipment and lockers stocked with basic apparatus. There are mechanical crushers and pulverizers, an electric oven, muffle and crucible furnaces, fume hood, oxygen bomb calorimeter, and five sets of balances, one of which, a microanalytical balance for tests in assaying, metallurgy and microanalysis, is accurate to 0.00001 grams. The equipment is constantly being replenished and added to. There is ample accommodation for performing complex experiments without interference, and opportunity for special experimentation and analysis on problems and products submitted to the laboratory.

Chemistry Laboratory 1A correlates the classroom theory by actual experiments performed and observations made. Chemical reactions are studied from a cause and effect relationship.

Qualitative Analysis includes determination of cations and anions according to the semimicro method.

Quantitative Analysis includes gravimetric and titrametric analysis, with options offered in the analysis of iron and steel, oils, fats and waxes, food analysis, and water analysis.

Organic Laboratory includes the synthesis of typical compounds. Of the many prepared and studied, the following are representative:

Methane	**Acetic Anhydride**	**Urea**	**Aniline**
Ethylene	**Ethyl Acetate**	**Acetyl Chloride**	**Benzene**
Acetylene	**Acetaldehyde**	**Butyl Bromide**	**Diphenyl Methane**
Acetic Acid	**Acetone**	**Glucose**	**Phenol**
Ethyl Ether	**Methylamine**	**Fructose**	**Picric Acid**

The industries of Fort Wayne offer a fertile and diversified field for inspection trips. The relation of chemistry to electrical, refrigerating and air-conditioning manufacturing processes are observable within easy access of the College. Sugar refining, water purification and softening, metal fabrication, processing and preserving foodstuffs, the making of fuel gas, paints and varnishes, and beverages are of interest to Indiana Tech students.

COURSE IN CHEMICAL ENGINEERING

(Detailed description of Chemical courses on pp. 38-39-40-41)

Term I

Cat. No.		Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

M	2	Trigonometry	5
Engl	2	English II	5
Ch	2	General Chemistry II	5
Ch	2A	Gen. Chem. Lab. 2A	2
ED	2	Engineering Drawing II	2
			19

Term III

M	3	Analytical Geometry	5
Ph	11	Electricity and Magnetism	5
Ch	3	Qualitative Analysis Theory	5
Ch	3A	Qualitative Analysis Lab.	3
ED	3	Engineering Drawing III	2
			20

Term IV

M	4	Differential Calculus	5
Ph	21	Statics and Dynamics	5
ME	1	Machine Shop I	2
ED	10	Descriptive Geometry	3
CE	1	Plane Surveying	5
			20

Term V

M	5	Integral Calculus	5
AM	1	Applied Mechanics I	5
Ph	31	Heat, Light and Sound	5
SM	1	Strength of Materials I	5
			20

Term VI

M	6	Calculus	5
AM	2	Applied Mechanics II	5
Ch	5A	Quantitative Analysis 1A	3
Ch	7	Organic Chemistry I	5
Ch	7A	Organic Chem. Lab. 1A	2
			20

Term VII

ME	20	Thermodynamics I	5
SM	2	Strength of Materials II	5
Ch	6A	Quantitative Analysis 2A	3
Ch	8	Organic Chemistry II	5
Ch	8A	Organic Chemistry 2A	2
			20

Term VIII

Ch	9	Physical Chemistry 1	5
ChE	1	Chemical Engineering I	5
EE	10	Elements of Electrical Engineering X	5
ME	21	Thermodynamics II or	5
CE	12	Hydraulics	
			20

Term IX

Ch	10	Physical Chemistry 2	5
ChE	2	Chemical Engineering II	5
Law	1	Engineering Law or	5
Ec	1	Economics	
		Elective	5
			20

ELECTIVES

Ch	9A	Physical Chemistry Lab.	2
Ch	101A	Applied Analysis	2
Ch E	4A	Chemical Engineering Plant Design	2
Ch E	3	Chemical Engineering Seminar	5
Ch E	10	Metallurgy	5
Ch E	21	Petroleum Engineering	5
Ch E	31	Rubber and Plastics I	5
Ch E	32	Rubber and Plastics II	5

Nine-Term Course (27 Months)—178 Term Hours

The Field of Civil Engineering

Civil Engineering is the oldest of the engineering professions, and may well be considered the parent of most of the other more or less specialized phases of Engineering Science. Egypt's pyramids; the Roman roads, bridges, and aqueducts; the channeling and dyke-building along China's Yellow River; are monuments to Civil Engineers who, thousands of years ago, pitted their skill against adverse Nature, overcoming her obstacles or holding in check her tremendous forces. Even as today the Civil Engineer builds our roads, so through the centuries, the profession of Civil Engineering prepared the figurative roads along which other branches of engineering have advanced.

In the light of modern progress, the Civil Engineer is even more notably indispensable than in the past. The construction of the radio station, the chemical works, the steel mill, the factory, the hydroelectric plant, is first made possible through the ability of the Civil Engineer in applying to special and individual requirements the skill and knowledge of his profession.

The Civil Engineer provides the means for commerce and intercourse between cities and nations. He builds railroads and highways, bridges and tunnels; he improves and deepens harbors and channels for ship traffic; and he constructs the shipyards where the far-plying vessels are built. His hangars, landing fields, and beacons are making travel in the air as safe and sure as travel on the ground, aiding materially in maintaining the definite and certain schedules which characterize America's airway commerce.

The Civil Engineer's reservoirs and filtration plants provide wholesome water for teeming cities; his irrigation projects transform deserts into farms; his sanitation systems banish fevers and plagues; and his factories and skyscrapers provide homes and work-places for millions of people.

Levees, dykes, channeling, and stream-redirection, each year materially diminish economic flood loss, while performing the more vital service of minimizing, in flood areas, the danger to life that has always existed. The Civil Engineer determines the boundaries of state and nation; his surveys are the bases of property rights in city, town and country, and all our maps are made by him. Without the Civil Engineer, the development of our civilization would have been impossible. He has been vitally necessary to progress since the dawn of history, and the complex structure of modern life makes greater demands upon him than have ever been made before. The past has always been dependent upon the Civil Engineer; the future must be so to an even greater degree.

Many projects, national in character, promise constantly increasing demand for graduates in Civil Engineering. Among them are nation-wide projects for electrification as typified by TVA; extended plans for flood control, especially in view of the disastrous Ohio Valley flood; the reconstruction of national highways to accommodate rapidly increasing and faster traffic, and projects for overcoming dust storms and soil erosion by reforestation and other means.

Civil Engineering Laboratory

The Civil Engineering course at Indiana Tech includes intensive practical laboratory work with modern field and testing equipment. In the Surveying courses all students are required to make complete and accurate surveys of assigned terrain areas, and to acquire facility in the use of all items of the surveyor's equipment under actual field conditions. Our six transits and levels are the product of world-famed manufacturers—namely: Berger, Keuffel and Esser, Gurley, and Dietzgen. These makes are acknowledged in engineering circles as among the finest obtainable. The student is thus assured of proper training in the use and care of exactly the same type and grade of instrument that he will be required to use in the most precise professional work.

The latest Keuffel and Esser level rods, with micrometer vernier targets, are used in the stadia-surveying practice work, and a thorough grounding is given in the applications of this valuable principle in distance calculations and checking. Chicago and Lufkin chains, designed for work of extreme accuracy, are employed. Our chains are of the type approved by the U. S. Bureau of Standards, carrying compensating scales to balance the expansion and contraction resulting from temperature changes. Sighting poles, pins, etc., conform with the highest professional standards.

An important adjunct to class work in the Concrete Design and Highway Engineering Course is the experimental mixing, curing and testing done in the Materials Testing Laboratory. Machines and equipment manufactured by the Tinius Olsen Company are used for tensile, compressive, and penetration tests on concrete specimens, as representative of the best obtainable for this purpose.

The function of laboratory work is to provide the student with the personal experience in the practical phases of his work which obviously cannot be obtained from classroom lectures and discussions. All such work at Indiana Tech is under the direction and supervision of experienced and competent men, hence, our laboratory successfully fulfills its purpose, and the gratifying success of our graduates in the professional field is ample proof that it does.

There is abundant opportunity in the City of Fort Wayne in the Engineering Department for observation and study of the work of the Civil Engineer in all types of municipal planning, engineering and surveying.

Indiana Tech Official Bench Mark

A bench mark, consisting of a round bronze plug, three inches in diameter, has been established for Indiana Technical College by its student civil engineers. The elevation of this station above mean sea-level has been carefully determined by repeated field surveys and has been checked with government bench marks.

COURSE IN CIVIL ENGINEERING

(Detailed description of Civil courses on pp. 41-42)

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

M	2	Trigonometry	5
Engl	2	English II	5
Ch	2	General Chemistry II	5
Ch	2A	Gen. Chem. Lab. 2A	2
ED	2	Engineering Drawing II	2
			19

Term III

M	3	Analytic Geometry	5
Ph	31	Heat, Light and Sound	5
CE	1	Plane Surveying	5
ED	10	Descriptive Geometry	3
ED	3	Engineering Drawing III	2
			20

Term IV

M	4	Differential Calculus	5
CE	2	Advanced Surveying	5
Ph	21	Statics and Dynamics	5
Law	1	Engineering Law	5
			20

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
Ph	11	Electricity and Magnetism	5
AM	1	Applied Mechanics I	5
CE	11	Railway and Highway Engineering	5
			20

Term VI

M	6	Calculus	5
SM	1	Strength of Materials I	5
EE	10	Elements of Electrical Engineering	5
AM	2	Applied Mechanics II	5
			20

Term VII

CE	12	Hydraulics	5
CE	20	Structural Design I	5
CE	30	Concrete I	5
SM	2	Strength of Materials II	5
			20

Term VIII

CE	21	Structural Design II	5
CE	3	Geology	5
ME	20	Thermodynamics I	5
CE	31	Concrete II	5
			20

Term IX

CE	10	Municipal Engineering	5
CE	22	Structural Design III	5
ME	40	Industrial Management	5
CE	32	Concrete III	5
			20

Nine-term Course (27 Months)—178 Term Hours

Electrical Engineering

The intensive twenty-seven months' course, in Electrical Engineering is planned, first of all, to give the student a thorough foundation in mathematics, science and engineering drawing. Instead of deferring the subjects of Electrical Engineering and the accompanying laboratory work, they are introduced in the second term. The courses stress:

DIRECT CURRENT CIRCUITS —electric, magnetic, and dielectric.

DIRECT CURRENT MACHINES —generators, motors and lifting magnets.

ALTERNATING CURRENT CIRCUITS—series and parallel circuits with constant concentrated characteristics — single phase and polyphase circuits—network theorems.

ALTERNATING CURRENT MACHINES — alternators, transformers, induction motors.

ELECTRONICS—physical electronics, industrial applications.

ELECTRICAL DESIGN — condensers, insulators, transformers, direct current generators, polyphase induction motors.

The Electrical Engineer must be familiar with his field, including the mechanical as well as the electrical aspects, whether he has to do with the housewife's electric iron or with the gigantic electric furnace. He must know how to select or how to design the correct motor in accordance with specific needs for power. He must have a practical as well as a theoretical knowledge and interest that will lead him to work out economies in powerhouse and production problems. His is the master mind in the field of communications. The modern automatic telephone with its instant and accurate service is a monument to his inventive genius and painstaking skill.

With the assurance of cheaper power, the fields of heating and illuminating are taking on an acceleration that will soon make the United States a nation that does its cooking, and most of its mechanical chores by the means of electricity. One readily foresees the immense demands that the development and utilization of power on a scale as contemplated by the electrification projects fostered by the federal government will make on the professionally trained man in the future.

Furthermore, the electrical engineer can find a separate field in the applications of electricity to chemical engineering in manufacturing processes concerned with ferro-alloys, aluminum, copper, caustic soda, carborundum, and in electrolysis.

There is also the specialization in Electronics which demonstrates the applications of the photo-cell, or "electric eye," whereby the inspection and measurement of mechanical parts is accomplished with a speed and accuracy that for all time eliminates the uncertainties of the human eye and hand.

The broad objective of the course in Electrical Engineering is to develop

the ability to analyze and solve Electrical Engineering problems from the business as well as from the technical standpoint. The student is encouraged to think independently and logically, and trained to assemble all the factors that enter into a given problem.

LABORATORY EQUIPMENT AND APPLICATIONS

The main E. E. Laboratory switchboard is arranged to provide the high degree of flexibility necessary for the numerous direct and alternating current experiments. It has available 3-Wire 110 volts A. C., 3-phase 220 volts A. C., 3-phase 440 volts A. C., 110 volts D. C., and 2-wire 230 volts D. C.

The E. E. Laboratory general equipment includes:

A 7½ H.P. 3-phase, 220 volt, convertible unit for use as a squirrel cage induction motor, as a wound rotor induction motor, as an alternator, or as a synchronous motor. When this assembly is used as a wound rotor induction motor, a drum switch controls starting, speed, and direction of rotation. Belted to the machine is a 5 K.W., 120 volts D.C. compound generator.

All machines are so arranged that it is possible to belt A.C. to D.C., or D.C. to D.C., thus making possible operation at varying speeds, voltages or loads.

There are 7 more motor-generator sets, ranging from 1¾ to 5 K.W. and 110 to 220 volts, for use in laboratory experiments. Two 3 K.V.A. laboratory transformers, 2 potential regulators, and a high-tension testing transformer compose the stationary A.C. equipment.

One 2 K.V.A. 2-phase synchronous converter, one 50 h.p. 3-phase squirrel cage induction motor, one 600 volt D.C. generator, and one 32 volt D.C. generator used for electroplating, provide additional facilities for experiments.

A high frequency transformer, powered by a 3 K.V.A., 30,000 volt 60-cycle transformer, is capable of producing potentials of more than one-half million volts.

Voltmeters, ammeters, wattmeters, watt-hour meters, tachometers, and minor items are other units of equipment in the E. E. laboratory.

E. E. Laboratory metering equipment includes:

- 10 precision A.C. Instruments;
- 8 precision D.C. Instruments;
- 1 Leeds & Northrop Type K Potentiometer;
- 1 Kohlrausch slide wire bridge;
- 1 Eppley Standard Cell;
- Several Standard Multipliers and high capacity standard shunts.
- 1 Oscillograph.

Standardization of cables throughout the laboratory facilitates connections being made without the use of tools.

The E. E. Laboratory utilizes 1,600 square feet of floor space. The extensive range of experimentation is under the personal supervision of the Director of the Laboratory.

COURSE IN ELECTRICAL ENGINEERING

(Detailed description of Electrical course on pp. 42-43-44)

Term I

Cat. No.		Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

Cat. No.		Subject	Cr. Hrs.
M	2	Trigonometry	5
Engl	2	English II	5
Ph	11	Electricity and Magnetism	5
EE	2A	Electrical Lab. 2A	2
ED	2	Engineering Drawing II	2
			19

Term III

Cat. No.		Subject	Cr. Hrs.
M	3	Analytic Geometry	5
PH	21	Statics and Dynamics	5
EE	3	Direct Current Circuits	5
ED	3	Engineering Drawing III	2
EE	41	Electrical Measurements	3
			20

Term IV

Cat. No.		Subject	Cr. Hrs.
M	4	Differential Calculus	5
Ph	31	Heat, Light and Sound	5
EE	4	Direct Current Machines	5
EE	4A	Electrical Lab. 4A	4
			19

Term V

Cat. No.		Subject	Cr. Hrs.
M	5	Integral Calculus	5
AM	1	Applied Mechanics	5
ME	20	Thermodynamics I	5
EE	5	Alternating Current Circuits	5
EE	5A	Electrical Lab. 5A	2
			22

Term VI

Cat. No.		Subject	Cr. Hrs.
M	6	Calculus	5
AM	2	Applied Mechanics II	5
EE	6	Alternating Current Machines	5
EE	6A	Electrical Lab. 6A	2
ED	10	Descriptive Geometry	3
			20

Term VII

Cat. No.		Subject	Cr. Hrs.
SM	1	Strength of Materials I	5
ME	21	Thermodynamics II	5
EE	21	Electrical Design I	3
EE	7	Alternating Current Machines	5
EE	7A	Electrical Lab. 7A	2
			20

Term VIII

Cat. No.		Subject	Cr. Hrs.
SM	2	Strength of Materials II	5
EE	31	Electronics I	3
EE	22	Electrical Design II	3
Law	1	Engineering Law or	5
EC	1	Economics	
RE	35	Medium and High Frequency Circuits	3
EE	8A	Electrical Lab. 8A	2
			21

Term IX

Cat. No.		Subject	Cr. Hrs.
EE	32	Electronics II	5
RE	36	Transmission Lines	3
ME	40	Industrial Management or	5
CE	12	Hydraulics	
EE	35	Electric Power Transmission and Distribution or	5
EE	45	Illuminating Engineering	
ME	1	Machine Shop I	2
			20

By Special Arrangement

Cat. No.		Subject	Cr. Hrs.
RE	5	Radio Engineering I	5
RE	6	Radio Engineering II	5
RE	15	Electrical Communication Systems	5

Nine-term Course (27 Months)—180 Term Hours.

The Field of Mechanical Engineering

Whether power results from the burning of coal or coke, or from the burning of liquid fuel directly, as in gasoline or Diesel engines, it is the job of the Mechanical Engineer to construct the elements of power construction and to facilitate the application of power to the smallest or to the largest demands of industry. He invents, designs and makes the necessary engines of power production, and constructs the transmission machinery to vary the application of power in volume and intensity befitting the wind-mill or the ocean liner.

Not only does he make all the machinery of factory and farm, and of transportation, but he makes the designs, the models, the patterns, the fast-cutting tools, the grinders, the drills and shapers that perform the thousands of exacting operations in making a tractor, an automobile or a Diesel locomotive. Every manufactured article, no matter what its nature, requires the services of mechanical engineers both in the design of the machines by which it is manufactured and in the operation of the factory itself, so that the development of any new device or industry increases the demand for mechanical engineers.

The varied equipment of the modern machine shop—the lathes, planers, shapers, milling machines, grinders, etc., are all creatures of the brain of the Mechanical Engineer, and are accurate untiring servants of his will, combining to produce a steady flow of manufactured parts that are assembled with scientific precision to supply the ever-increasing demands for machines of all kinds. The steel mill with its enormous power plant and gigantic machines for handling and refining ore, and for shaping iron and steel products, is one of the most impressive examples of modern mechanical engineering.

The entire field of office appliances—typewriters, comptometers, adding, listing and billing machines, cash registers, folding and cancelling machines, light weight safes, modern filing equipment, the gadgets in use about an office—all are products of the ingenuity and skill of the Mechanical Engineer.

Rapid progress in the fields of refrigeration and air conditioning open interesting special branches of mechanical engineering. The architect and civil engineer collaborate in the construction of the factory or office building, but the problems of heating and ventilating, air purification and air conditioning, are solved by the mechanical engineer.

The Mechanical Engineer cooperates with the Aeronautical Engineer in making the modern high-power aircraft engine and in the application of its power. He cooperates with the Electrical Engineer in converting the power of waterfalls, turbines, and liquid fuel engines into electrical energy.

The Mechanical Engineer has served industry in the standardization of various mechanical parts, so that interchangeability and standard specifications may facilitate construction and replacement at the lowest expense.

The Mechanical Engineer is not a machinist, a mechanic, or an engine-

man. Nor is he a tradesman. He is all of these and more. He is a scientist, a mathematician, a draftsman, a designer, and an originator as well as an efficiency expert. The young man who has become efficient in the broad fundamental principles of mechanical engineering can, in a short time, make himself indispensably valuable in any one of hundreds of types of industry.

LABORATORY APPLICATION AND DEVELOPMENT

The Mechanical Engineering course follows the Tech plan of laying a strong basis in mathematics, drawing, and science, expanded into the applied technical subjects of Metallurgy, Engines and Boilers, Hydraulics, Mechanics, Electricity, Machine Design, and Internal Combustion Engines, which in their turn find expression in shop and laboratory courses.

The Mechanical Laboratory contains a 3-unit assembly of a conventional solid-injection Diesel and a standard gasoline engine, belt-connected with a generator, for comparative testing and experimentation in the conversion of heat into electrical energy. Other engines, including a standard radial aircraft engine, are displayed for study. There are also facilities for testing oil as to flash, pour, and cloud points to illustrate standard procedure in scientific oil and fuel testing. Students electing refrigeration and air conditioning are provided with units from prominent manufacturers for study and testing. Likewise, inspection trips in Fort Wayne are possible to see modern refrigeration and air conditioning machinery in the process of manufacture.

The machine shop is equipped with lathes, drill presses, planers, milling-machine, power saw, and related equipment including tools and gauges. The student acquires a fundamental knowledge of machine and shop operation that readily transfers to the operation of more diversified machinery in manufacturing processes, and to the planning and control of production flow.

Fundamental machining operations teach the properties and the utility of the typical metals, such as steel, copper, brass, bronze, aluminum, and various alloys. In the design courses this knowledge is readily applied to the composition of a piece of machinery to meet modern requirements as to manufacturing economy and efficiency.

Specialized Branches of Mechanical Engineering

The field of mechanical engineering is so broad that no man can be an authority on all its branches. Practicing engineers tend to become specialists in chosen branches. The course in mechanical engineering at Indiana Technical College offers specialized courses in the chief branches of mechanical engineering such as air conditioning, internal combustion engines, including Diesels, refrigeration, steam power plants, industrial organization and management. The fundamentals of each of these is thoroughly covered and sufficient practical application and current practice given so that the graduate will be able to fit easily into engineering positions along any line for which he is trained or such as opportunity affords.

The expanded machine design course provides specialization to meet the demand for machine designers and tool designers in the current national emergency and in the period to follow.

COURSE IN MECHANICAL ENGINEERING

(Detailed description of Mechanical courses on pp. 44-45-46)

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
Engl	1	English I	5
ED	1	Engineering Drawing I	2
			19

Term II

Cat.	No.	Subject	Cr. Hrs.
M	2	Trigonometry	5
Ph	11	Electricity and Magnetism	5
Engl	2	English II	5
ED	2	Engineering Drawing II	2
ME	1	Machine Shop I	2
			19

Term III

Cat.	No.	Subject	Cr. Hrs.
M	3	Analytic Geometry	5
Ph	21	Statics and Dynamics	5
Law	1	Engineering Law	
		or	5
Ec	1	Economics	
ED	3	Engineering Drawing III	2
ME	1	Machine Shop II	2
			19

Term IV

Cat.	No.	Subject	Cr. Hrs.
M	4	Differential Calculus	5
Ph	31	Heat, Light and Sound	5
AM	1	Applied Mechanics I	5
ED	10	Descriptive Geometry	3
ED	4	Engineering Drawing IV	2
			20

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
AM	2	Applied Mechanics II	5
SM	1	Strength of Materials I	5
ME	20	Thermodynamics I	5
			20

Term VI

Cat.	No.	Subject	Cr. Hrs.
M	6	Calculus	5
SM	2	Strength of Materials II	5
ME	10	Mechanism	5
ME	21	Thermodynamics II	5
			20

Term VII

Cat.	No.	Subject	Cr. Hrs.
ME	12	Machine Design I	5
ME	30	Internal Combustion Engines	5
CE	1	Plane Surveying	5
ME	35	Heating and Air Conditioning	5
			20

Term VIII

Cat.	No.	Subject	Cr. Hrs.
ME	38	Steam Power Plants	5
ME	32	Refrigeration	5
ME	13	Machine Design II	5
EE	10	Elements of Electrical Engineering	5
			20

Term IX

Cat.	No.	Subject	Cr. Hrs.
ME	45	Seminar	5
ME	40	Industrial Management	
		or	5
ME	42	Industrial Relations	
ME	14	Machine Design III	5
CE	12	Hydraulics	5
			20

Nine-term Course (27 Months)—177 Term Hours.

MECHANICAL DRAFTING COURSE

The course in Mechanical Drafting is intended to meet the needs of students who desire a career in drafting and design rather than in engineering work. The subject-matter of the Course has been selected or created to provide (1) skill in the mechanical operations of drafting; (2) knowledge of fundamental mathematics and science required for the computations a draftsman must make; and (3) a knowledge of design. The fundamental plan of the course emphasizes the fact that the trained mind behind the pencil is of greater importance than the required mechanical skill.

Industry requires: First, the ability to produce AT ONCE on the drawing board; and, Second, a necessary knowledge of fundamental mathematics, science and engineering to attack its problems, and to acquire, with a minimum of individual instruction, the further specialized knowledge required in each individual industry.

By virtue of the five courses in Engineering Drawing, graduates will be able to undertake with confidence any drawing which their employer may assign them. Because of the courses in science and mathematics, they will also understand the purpose of the machine part they are drawing, and the reason for its size and shape. And finally, they will have a firm foundation on which to build the specialized knowledge which distinguishes the Chief Draftsman from those under his direction.

Seventy-five per cent of the subject-matter is identical to that in the regular engineering courses. This course, therefore, also appeals strongly to the man who at the time can see his way clear to only one year in college, but who hopes later to return and receive his engineering degree.

OUTLINE OF MECHANICAL DRAFTING COURSE

Term I

Cat. No.		Subject	Cr. Hrs.
M	1	College Algebra	5
ED	1	Engineering Drawing I	2
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
Engl	1	English I	5
			19

Term II

Cat. No.		Subject	Cr. Hrs.
M	2	Trigonometry	5
ED	2	Engineering Drawing II	2
ED	3	Engineering Drawing III	2
Ph	11	Electricity and Magnetism	5
Engl	2	English II	5
			19

Term III

Cat. No.		Subject	Cr. Hrs.
ED	4	Engineering Drawing IV	2
ME	1	Machine Shop I	2
ED	10	Descriptive Geometry	3
AM	3	Elements of Applied Mechanics	5
Ph	21	Statics and Dynamics	5

Term IV

Cat. No.		Subject	Cr. Hrs.
ED	5	Tracing	2
ME	2	Machine Shop II	2
ME	11	Elementary Machine Design	5
SM	3	Elements Strength of Materials	5
Ph	31	Heat, Light and Sound	5
			19

One-year Course (12 Months)—74 Term Hours.

Radio Engineering

INCLUDING TELEVISION

The course in Radio and Television Engineering includes the customary work in mathematics, science and engineering drawing and forty-nine term hours in Electrical Engineering and the accompanying laboratory work. The course is planned to specialize a fundamental knowledge of electrical engineering to scientific application in the field of radio and television. This end is accomplished by including fifty-eight hours in the subjects of Radio and Television Theory, Measurements, Radio Engineering, Communication and Laboratory Work, a specialization found in few courses offered in this field.

The ready transmission of sound and its reception has been a great boon to modern civilization. Now the poor as well as the rich have the delights of the world's best music, entertainment and information at their own firesides. American homes contain between twenty-two and twenty-three million receiving sets. Continued improvement prompts constant replacement of these sets with others still more compact and efficient—more precise and accurate in operation. The advent of television will bring about radical changes in receiving sets and a complete revolution of structure and function of the entire network of broadcast stations.

Comparative improvements will come in the commercial, marine and aircraft fields. In a recent talk before a Tech convocation, an authority on air transportation sketched the future place of radio in the navigation of aircraft and in landing technique. Radio as applied to aero-navigation is becoming one of the most important phases of engineering. Through the contributions of radio engineers, planes are able to fly distances through adverse weather on schedule time, and land in perfect safety.

The electron telescope, a contribution of the radio engineer, is an ultra-new development similar to the cathode ray tube, which enables the pilot to see the landing field and the runways ahead through fog so thick as to blind the most powerful searchlight. The electron tube, outgrowth of research and study, has revolutionized many industrial technical methods. It enables them to sort packages, grade textiles, differentiate colors, stoke furnaces, treat diseases, and measure the heat of distant stars. Its applications apparently are limitless, and all are specializations of radio engineering.

Radio and Electrical Engineering

Radio Engineering is a highly specialized branch of Electrical Engineering. The Radio Engineering course includes Electricity and Magnetism, Direct Current Circuits, Direct Current Machines, Alternating Current Circuits and Alternating Current Machines, with laboratory work, Electronics and Electrical Design as a basis for and a means of amplification and specialization of Radio Engineering subject matter.

Upon graduation from such a course the Radio Engineer is qualified for the electrical field, especially as pertaining to electronic applications, as well as for the numerous specialized phases of the radio and television fields.

Radio Laboratory Practice

Laboratory work is given partly to present a tangible explanation of radio theory as studied, and partly to learn new methods of application. Experimental set-ups are made by the student to enable him to prove to his own satisfaction the truth of the theory he has learned.

The multi-purpose Oscillograph, for example, shows what electrical surges actually look like, and the effect of one wave upon another. It presents a new method of investigating high frequency phenomena which heretofore was only partially provided by meters and other measuring instruments. It also provides analytical results in regard to various apparatus to which it is connected. The use of the Oscillograph with the high fidelity amplifier enables the student not only to hear the results of his experiments, but to see them as well. The Cathode Ray tube is much larger than those ordinarily in use; therefore, it enables the student to detect very minute manifestations of radio phenomena that would otherwise escape unnoticed.

The Amateur transmitter (W9BHR) of latest design is for use in teaching traffic control and for experience in communication with other 'phone and code stations, as a supplement to the radio code courses.

Supplementary to the laboratory work frequent excursions are made to the 10,000-watt transmitter of WOWO where detailed study and inspection are made of the equipment and the technic of operating a modern high-power broadcast station.

Special apparatus is constantly under process of design and construction. Some of the standard apparatus in use:

Radio Frequency Resistance Bridge;

Beat Frequency Oscillator;

Television Transmitter and Receiver;

Multi-Purpose Oscillograph including a specially designed 9-inch Cathode Ray Tube;

Precision Wave Meter;

Ultra-Sensitive Vacuum Tube Voltmeter;

Leeds & Northrup (Type K) Potentiometer;

3″ Oscilloscope;

External Sweep Circuit with Amplifier (for Television);

100-volt D-C Motor Generator Set;

Weston (Model 772) Set Analyzer;

Weston Photo Relay System;

1,000-cycle Audio Oscillator;

Two Laboratory Micro Ammeters;

Standard Signal Generator;

General-Purpose Precision A-C Bridge.

Because of the highly technical nature of most of the experimentation in the Radio Laboratory, the work is conducted under the direct supervision of the Director of the Department, assuring students of contact with an engineer thoroughly experienced in radio development and application.

COURSE IN RADIO ENGINEERING

(Detailed description of Radio courses on pp. 46-47-48)

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
Ch	1	General Chemistry I	5
Ch	1A	Gen. Chem. Lab. 1A	2
ED	1	Engineering Drawing I	2
			19

Term II

Cat.	No.	Subject	Cr. Hrs.
M	2	Trigonometry	5
Engl	2	English II	5
Ph	11	Electricity and Magnetism	5
EE	2A	Electrical Lab. 2A	2
ED	2	Engineering Drawing II	2
			19

Term III

Cat.	No.	Subject	Cr. Hrs.
M	3	Analytic Geometry	5
RE	2	Radio Theory II	5
RE	2A	Radio Lab. 2A	2
EE	3	Direct Current Circuits	5
ED	3	Engineering Drawing III	2
			19

Term IV

Cat.	No.	Subject	Cr. Hrs.
M	4	Differential Calculus	5
RE	3	Radio Theory III	5
RE	3A	Radio Lab. 3A	2
EE	4	Direct Current Machines	5
Ph	21	Statics and Dynamics	5
			22

Term V

Cat.	No.	Subject	Cr. Hrs.
M	5	Integral Calculus	5
EE	5	Alternating Current Circuits	5
EE	4A	Electrical Lab. 4A	4
RE	15	Electrical Communication Systems	3
EE	31	Electronics I	3
			20

Term VI

Cat.	No.	Subject	Cr. Hrs.
M	6	Calculus	5
RE	35	Medium and High Frequency Circuits	5
EE	32	Electronics II	3
EE	5A	Electrical Lab. 5A	2
Ph	31	Heat, Light and Sound	5
			20

Term VII

Cat.	No.	Subject	Cr. Hrs.
RE	5	Radio Engineering I	5
RE	36	Transmission Lines	3
EE	6	Alternating Current Machines	5
EE	6A	Electrical Lab. 6A	2
RE	11	Radio Shop	2
EE	21	Electrical Design I	3
			20

Term VIII

Cat.	No.	Subject	Cr. Hrs.
RE	6	Radio Engineering II	5
RE	41	Radio Frequency Measurements I	4
EE	7	Alternating Current Machines	5
EE	7A	Electrical Lab. 7A	2
Law	1	Engineering Law or	5
EC	1	Economics	
			21

Term IX

Cat.	No.	Subject	Cr. Hrs.
RE	45	Acoustical Engineering	5
RE	31	Television Engineering	5
RE	42	Radio Frequency Measurements II	4
RE	21	Radio Design	3
EE	22	Electrical Design II	3
			20

Nine-term Course (27 Months)—180 Term Hours.

One-Year Radio Course

The one-year Radio Course has been planned primarily for the man who is interested in entering one of the vocational fields of radio, such as radio service, public address, radio stations, and work lying in the field of the technician rather than that of the engineer.

The course covers the necessary technical subject-matter required to pass the Federal Communications Commission operators' license examinations in the following fields: amateur, aircraft, broadcast, commercial and marine radio. It is also planned to meet the needs for vocational training in the radio service field. In this respect, it not only trains the student in modern and systematic service methods but also acquaints him with the latest developments in test equipment.

It will be observed that a large proportion of the subject-matter in this course has been selected from the regular engineering curriculum. Therefore, if a student wishes to, after completing the one-year course, he may continue with the two-year engineering course with but little loss of time.

This course makes a strong appeal by the opportunity it offers to the man who cannot, for the present, see his way clear to complete the Radio Engineering course. He can complete the one-year course, and then at a later date, when his circumstances permit it, return for the remainder of the work for the Bachelor of Science degree in Radio Engineering.

OUTLINE OF ONE-YEAR RADIO COURSE

Term I

Cat.	No.	Subject	Cr. Hrs.
M	1	College Algebra	5
Engl	1	English I	5
RE	1	Radio Theory I	3
EE	2A	Electrical Lab. 2A	2
*RO	1	Code I	2
ED	1	Engineering Drawing I	2
			19

Term II

Cat.	No.	Subject	Cr. Hrs.
M	2	Trigonometry	5
RE	2	Radio Theory II	5
RE	2A	Radio Lab. 2A	2
Engl	2	English II	5
*RO	2	Code II	2
			19

Term III

Cat.	No.	Subject	Cr. Hrs.
M	3	Analytic Geometry	5
RE	3	Radio Theory III	5
RE	3A	Radio Lab. 3A	2
EE	3	Magnetic and Electrostatic Circuits	5
*RO	3	Code III	2
ED	2	Engineering Drawing II	2
			21

Term IV

Cat.	No.	Subject	Cr. Hrs.
*RO	4	Principles of Radio Operation	5
EE	4	Direct Current Machines	5
EE	4A	Electrical Lab. 4A	4
RO	5	Receiver Analysis	5
			19

Code Options: Students planning to become commercial radio operators should take RO 2M and RO 3M American Morse Code, 2M and 3M, in addition to RO 1, 2, and 3.

Television is included in RO 5.

***Approved courses of interest may be substituted.**

One Year Course (12 Months)—78 Term Hours.

Description of Courses

Excepting those common to all departments, the courses offered are here grouped according to departments, with a brief outline of their content.

Explanation of the credit rating of college courses:

"ENGLISH 1. (5 plus 0) Credit 5." This means that the first term of English is taught five periods a week, with no laboratory work, and entitles the student to five term hours of credit toward his degree. The figure before the word "plus" indicates weekly classroom recitations, and the figure after the word "plus" indicates the periods per week spent in the laboratory, drawing room, or on field trips.

General

Ec 1 ECONOMICS. (5 plus 0) Credit 5.

Must be preceded by English I and II. A study of the basic principles upon which business proceeds in a society, emphasizing the economic relationships of the engineer.
Economics—Fairchild, Furniss and Buck.

Law 1 ENGINEERING LAW. (5 plus 0) Credit 5.

A study of legal principles applied to specifications and engineering contracts; safeguards in the preparation of contracts; legal relationship of engineers.
Contracts in Engineering—Tucker.

***Engl. 1 ENGLISH I.** (5 plus 0) Credit 5.

The mechanics of writing; exercise in oral and written exposition; vocabulary building.
Remedial English—Guiler and Henry; selected readings in descriptive exposition.

Engl. 2 ENGLISH II. (5 plus 0) Credit 5.

Must be preceded by English I. Analysis of technical writing; oral expression; engineering report writing; selected readings in descriptive and narrative exposition.
The Engineer's Manual of English—Sypherd and Brown; Through Engineering Eyes—Cullimore.

AM 1 APPLIED MECHANICS I. (5 plus 0) Credit 5.

Must be preceded by Physics 21 and accompanied by Mathematics IV. Theory and general principles; concurrent forces; coplaner and non co-planer; parallel forces; stresses in trusses and bents; friction; classes and laws; graphic and algebraic solution.
Applied Mechanics—Poorman.

AM 2 APPLIED MECHANICS II. (5 plus 0) Credit 5.

Must be preceded by Applied Mechanics I and accompanied by Mathematics V. Centroids and centre of gravity planes and axes of symmetry; centroids of force systems; moment of inertia of areas; polar moments and computations; rectilinear and curvilinear motion; moment of inertia of masses; rotation and translation; work and power.
Text same as for Applied Mechanics I.

AM 3 ELEMENTS OF APPLIED MECHANICS. (5 plus 0) Credit 5.

Must be preceded by Mathematics II and accompanied by Physics 21. A course covering the essentials of Applied Mechanics I and II, for Drafting students only.
Practical Mechanics and Strength of Materials—Leigh and Mangold.

SM 1 STRENGTH OF MATERIALS I. (5 plus 0) Credit 5.

Must be preceded by Applied Mechanics I and accompanied by Mathematics V. Theory and principles; elastic stresses and deformations; tension, compression, and shear; design of riveted joints; shear and moment diagrams; stresses and deflection in simple and cantilever beams; uniform and concentrated loads; fixed and continuous beams.
Strength of Materials—Poorman.

SM 2 STRENGTH OF MATERIALS II. (5 plus 0) Credit 5.
Must be preceded by Strength of Materials I. Continuation of Strength of Materials I. Resilience; torsion; combined stresses; flexual and direct stresses; eccentric loading; normal shearing stresses; theory of columns; Euler's and Rankine's formulae; straight line and general formulae; deflection of beams by moment area method.
Text same as for Strength of Materials I.

SM 3 ELEMENTS OF STRENGTH OF MATERIALS. (5 plus 0) Credit 5.
Must be preceded by Applied Mechanics III.
A brief course for Mechanical Drafting Course Students.
Text same as for AM III.

Ph 11 PHYSICS—Electricity and Magnetism. (5 plus 0) Credit 5.
Must be preceded by college algebra. The fundamentals of electricity and magnetism. Lectures and recitations on magnetism, electrostatics, the electric current, electrical measurements, applications of Ohm's and Joule's Laws, electromagnetism, induction, and dynamoelectric machines.
Physics for Technical Students—Anderson.

Ph 21 PHYSICS—Statics and Dynamics. (5 plus 0) Credit 5.
Must be preceded by trigonometry. Lectures and recitations on measurement; composition and resolution of forces; friction, work, and power; rotary and translatory motion; molecular structure; properties of solids and fluids at rest and in motion.
Text same as for Physics 11.

Ph 31 PHYSICS—Heat, Light and Sound. (5 plus 0) Credit 5.
Must be preceded by college algebra. Lectures and recitations on thermometry; calorimetry; change of state; steam and gas engines. Nature and propagation of light; laws of reflection and refraction; lens and mirror systems. Production and transmission of sound; characteristics of musical sound; relation of musical sounds.
Text same as for Physics 11.

CAA 1 and CAA II. Credit, 3 hrs. and 5 hrs. respectively.
Successful completion of ground school courses, elementary or secondary, under Civil Aeronautics Administration.

MATHEMATICS

***M 1 COLLEGE ALGEBRA.** (5 plus 0) Credit 5.
Must be preceded by high school algebra or Mathematics A. Simultaneous equations and determinants; quadratic equations; ratio, proportion and variation; progressions, binomial theorem and logarithms.
College Algebra—Rosenbach and Whitman.

M 2 TRIGONOMETRY. (5 plus 0) Credit 5.
Must be preceded by College Algebra. Elements of Trigonometry, the relations between trigonometric functions; solution of right triangles, functions of large angles, practical applications; functions involving more than one angle and solutions of oblique triangles; complex numbers and DeMoivre's Theorem.
Plane Trigonometry—Brink.

M 3 ANALYTIC GEOMETRY. (5 plus 0) Credit 5.
Must be preceded by Mathematics II. A study of the point, the straight line, equations and loci, conic sections, parametric and polar equations, including points, planes, lines and surface space.
Brief Analytic Geometry—Mason and Hazard.

***MATHEMATICS A, B and C, non-credit courses open to students who need a review of high school algebra.**

M 4 DIFFERENTIAL CALCULUS. (5 plus 0) Credit 5.
Must be preceded by Mathematics III. The rules of differentiation, maxima and minima, and other applications.
Calculus—Smith, Salkover and Justice.

M 5 INTEGRAL CALCULUS. (5 plus 0) Credit 5.
Must be preceded by Differential Calculus. A study of indefinite and definite integrals and methods of integration; practical applications.
Text same as for Differential Calculus.

M 6 CALCULUS. (5 plus 0) Credit 5.
Must be preceded by Integral Calculus. Multiple integrals, series, hyperbolic functions; an introduction to differential equations.
Text same as for Integral Calculus.

M 101 DIFFERENTIAL EQUATIONS. (5 plus 0) Credit 5.
Must be preceded by Calculus. Course given by arrangement. Solution of linear differential equations and those of first and second order; singular and series solutions.
Differential Equations—Kells.

AERONAUTICAL ENGINEERING

AeE 1 PRINCIPLES OF AERONAUTICS. (3 plus 0) Credit 3.
The construction and operation of airplanes, emphasizing modern improvements and developments, and outlining essential parts. Aerodynamic factors of airfoils; the airplane engine; methods of designing the airplane structure, including wing, tail, fuselage, and landing gear. Open to non-aeronautical students.
The Airplane and Its Engine—Chatfield, Taylor and Ober.

AeE 2 AERODYNAMICS I. (5 plus 0) Credit 5.
Elementary aerodynamics, airfoils, wing lift and drag, parasite resistance, performance methods, stability, and analysis of forces causing fundamental motions.
Airplane Design—Warner.

AeE 2A AERODYNAMICS LABORATORY 1A. (0 plus 6) Credit 2.
Taken in conjunction with Aerodynamics I. Wind tunnel testing of airfoils; determination of lift, drag and center of pressure by two methods.
Laboratory Fee, Per Term, $3.00.

AeE 3 AERODYNAMICS II. (5 plus 0) Credit 5.
Must be preceded by Aerodynamics I. Advanced aerodynamics and the study of stability, maneuverability, and controllability of airplanes. The student is required to compute the performance of a complete airplane by two methods.
Same text as for Aerodynamics I.

AeE 3A AERODYNAMICS LABORATORY 2A. (0 plus 6) Credit 2.
Taken in conjunction with Aerodynamics II. Wind tunnel testing of airfoils; primary structure and scale models for complete airplanes.
Laboratory Fee, Per Term, $3.00.

AeE 4 AERODYNAMICS III. (5 plus 0) Credit 5.
Advanced study and calculations of wing section data, airplane model tests, parasite drag data, control surface design, engine and propeller considerations, performances, variations of rate of climb with altitude, aspect ratio, and parasite drag, reduction of observed performance to standard conditions, range and endurance, special flight problems, performance estimation, and seaplane floats. Principles of aerostatics.
Aerodynamics—Diehl.

AeE 4A AERODYNAMICS LABORATORY 3A. (0 plus 6) Credit 2.
Advanced wind tunnel study and performance calculations.
Laboratory Fee, Per Term, $3.00.

AeE 6 METEROLOGY AND AVIGATION. (3 plus 0) Credit 3.
A study of Aeronautical Methods of weather observations and predictions, emphasizing cloud formations, wind velocities; directions aloft and at the ground; weather map interpretation and construction; and problems in aerial navigation.
Meteorology, Synoptic and Aeronautic—Byers.

AeE 7 PROPELLER DESIGN. (2 plus 0) Credit 2.
Must be preceded by Aerodynamics I, Mathematics V and Physics II. Design and analysis of screw propellers according to theories of Drzwiecki.
Aircraft Propeller Design—Weick.

AeE 7A PROPELLER DESIGN LABORATORY. (0 plus 6) Credit 2.
Design and graphical stress analysis of screw propellers. Propeller design using N. A. C. A. propeller charts.

AeE 8 AIRPLANE DESIGN I. (5 plus 0) Credit 5.
Must be preceded by Aerodynamics III and Mathematics VI. Study of several types emphasizing the trend in design of past and present airplanes; factors that dictate the type and design of an airplane; design and layout of complete airplane.
Airplane Structures—Niles and Newell.

AeE 8A AIRPLANE DESIGN LABORATORY 1A. (0 plus 15) Credit 5.
Layout of three-view drawing of airplane, complete stress analysis of wing structure for several conditions; spare designs, rib design, balance diagram, fuselage design and stress for several conditions, in accordance with U. S. Dept. of Commerce Regulations.

AeE 9 AIRPLANE DESIGN II. (0 plus 15) Credit 5.
Must be preceded by Propeller Design and Airplane Design I. Continuation and completion of Airplane Design I, including advanced problems by method of least work, and method of elastic weights, graphical and analytical stress analysis.
Text same as for Airplane Design I.

AeE 9A AIRPLANE DESIGN LABORATORY 2A. (0 plus 15) Credit 5.
Completion of individual design started in Airplane Design 1A. Complete stress-analysis of undercarriage for several conditions; design of all members of undercarriage, undercarriage fittings, and of adjustable stabilizer; stress and design of engine mount, and design of spar fittings; U. S. Dept. of Commerce Regulations.

AeE 11 SEAPLANE DESIGN. (3 plus 0) Credit 3.
Must be preceded by Airplane Design I. Elements of marine design; displacement and buoyancy; stability afloat; seaplane performance considerations; load.
Seaplane Design—Nelson.

AeE 11A SEAPLANE DESIGN LABORATORY. (0 plus 9) Credit 3.
Design of floats for airplane originally designed in Airplane Design I. Graphical determination of load water line and center of buoyancy. Three-view drawing.

AeE 20 AIRPORTS AND AIRWAYS. (2 plus 0) Credit 2.
General study of the methods of operation of airports and airways. Airport management; flight schedules; maintenance costs and cost distribution.

CHEMISTRY

***Ch 1 GENERAL CHEMISTRY I. (5 plus 0) Credit 5.**
Must be preceded by High School Chemistry. Basic laws and theories of chemistry. Introduction to non-metals.
Introductory College Chemistry—Babor and Lehrman.

Ch 1A GENERAL CHEMISTRY LABORATORY 1A. (0 plus 6) Credit 2.
A laboratory study of general chemical principles.
Experiments and Problems for College Chemistry—Belcher and Colbert, or Properties and Numerical Relationships of the Common Elements and Compounds—Belcher and Colbert.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 2 GENERAL CHEMISTRY II. (5 plus 0) Credit 5.
Must be preceded by Chemistry 1 and IA. Continuation of Chemistry I.
Text same as for General Chemistry I.

Ch 2A GENERAL CHEMISTRY LABORATORY 2A. (0 plus 6) Credit 2.
A continuation of Chemistry 1A.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 3 QUALITATIVE ANALYSIS THEORY. (5 plus 0) Credit 5.
Must be preceded by Chemistry 1, 1A, 2, 2A and Mathematics 1. Structure of matter; nomenclature; redox equations; mass action applied to homogeneous equilibrium, heterogeneous equilibrium, hydrolysis, and complex ions.
Semimicro Qualitative Analysis—Middleton and Willard.

Ch 3A QUALITATIVE ANALYSIS LABORATORY. (0 plus 9) Credit 3.
Must be preceded by Chemistry 2 and 2A. A systematic semimicro qualitative analysis of the more common cations and anions. The final sample includes analysis of both cations and anions, and may be a solution, an ore, an alloy, or solid inorganic salts.
Text same as for Chemistry 3.
Laboratory Fee, Per Term, $3.00. *Breakage Fee Deposit, Per Term,* $1.00.

Ch 5A QUANTITATIVE ANALYSIS 1A. (1 plus 6) Credit 3.
Must be preceded by Chemistry 3A. The Principles of Gravimetric Analysis.
Inorganic Quantitative Analysis—Fales and Kenny.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 6A QUANTITATIVE ANALYSIS 2A. (1 plus 6) Credit 3.
Must be receded by Chemistry 3A. The Principles of Titrametric Analysis applied to acidimetry and alkalimetry, reactions involving oxidation and reduction, and titrations involving the formation of precipitates.
Text same as for Quantitative Analysis 1A.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 7 ORGANIC CHEMISTRY I. (5 plus 0) Credit 5.
Must be preceded by Chemistry 3. A study of the aliphatic compounds of organic chemistry. Type reactions, structure of organic compounds, and isomerism.
Organic Chemistry—Ray.

***CHEMISTRY A, a preparatory non-credit course, is open to students who need a review of high school chemistry.**

Ch 7A ORGANIC CHEMISTRY LABORATORY 1A. (0 plus 6) Credit 2.
The preparation and study of properties of typical organic compounds.
A Laboratory Manual of Organic Chemistry—Fisher.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 8 ORGANIC CHEMISTRY II. (5 plus 0) Credit 5.
Must be preceded by Chemistry 7. A continuation of Organic Chemistry I. The study of the aromatic compounds of Organic Chemistry.
Text same as for Organic Chemistry I.

Ch 8A ORGANIC CHEMISTRY LABORATORY 2A. (0 plus 6) Credit 2.
A continuation of Chemistry 7A.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 9 PHYSICAL CHEMISTRY I. (5 plus 0) Credit 5.
Must be preceded by Chemistry 3A, 5A, 6A, 7A, 8A, and Mathematics VI. A critical study of substances in the gaseous, liquid, and solid states, and solutions.
Physical Chemistry for Colleges—Millard.

Ch 9A PHYSICAL CHEMISTRY LABORATORY 1A. (0 plus 6) Credit 2.
Selected list of experiments illustrating the laws of chemistry.
Laboratory Manual of Physical Chemistry—Davison, VanKlooster and Bauer.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

Ch 10 PHYSICAL CHEMISTRY II. (5 plus 0) Credit 5.
A continuation of Physical Chemistry I. Homogeneous equilibrium, heterogeneous equilibrium, electrochemistry.
Text same as for Physical Chemistry I.

Ch 101A APPLIED ANALYSIS. (0 plus 6) Credit 2.
Must be preceded by Chemistry 5A and 6A. Application of the principles of gravimetric and volumetric analysis to testing and analysis of materials of importance to industry. Options in: (a) Analysis of Iron and Steel; (b) Analysis of Oils, Fats, and Waxes; (c) Food Analysis; (d) Water Analysis.
Laboratory Fee, Per Term, $3.00. Breakage Fee Deposit, Per Term, $1.00

CHEMICAL ENGINEERING

ChE 1 CHEMICAL ENGINEERING I. (5 plus 0) Credit 5.
Must be preceded or accompanied by Chemistry 9. A study of the principles of fluid mechanics, heat transmission, diffusion and evaporation.
Elements of Chemical Engineering—Badger and McCabe.

ChE 2 CHEMICAL ENGINEERING II. (5 plus 0) Credit 5.
Must be preceded or accompanied by Chemistry 10. A continuation of Chemical Engineering I. A study of the unit processes, such as drying, distillation, crushing and grinding, gas absorption, crystallization and filtration.
Text same as for Chemical Engineering I.

ChE 3 CHEMICAL ENGINEERING SEMINAR (5 plus 0) Credit 5.
A series of ten reports on selected topics in Chemistry and Chemical Engineering. Use and sources of chemical literature and patents.
Library Guide for the Chemist—Soule.

ChE 4A CHEMICAL ENGINEERING PLANT DESIGN. (0 plus 6) Credit 2.
Application of physical, chemical and mechanical principles to design of machinery and equipment of chemical engineering.
Chemical Engineering Plant Design—Vilbrandt.

ChE 10 PRINCIPLES OF METALLURGY. (5 plus 0) Credit 5.
Must be preceded or accompanied by Ch E 1 and Ch 9. Ores and ore dressing. A study of typical and economically important metals recovered by hydrometallurgical, pyrometallurgical, and electrometallurgical processes. Crystal structure, alloys, heat treatment and machanical working.
Introduction to Metallurgy — Newton.

ChE 21 ELEMENTS OF PETROLEUM ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by ChE 1 and Ch 9. Must be preceded or accompanied by ChE 2 and Ch 10. The geology, properties, and drilling of crude petroleum. Refining crude into gasoline, lubricating oils and asphalts. Thermal and catalytic cracking; reforming; polymerization; alkylation and isomerization.
Petroleum Refinery Engineering—Nelson and Fundamentals of the Petroleum Industry—Hager.

ChE 31 RUBBER AND PLASTICS I—Production and Synthesis. (5 plus 0) Credit 5.
Must be preceded or accompanied by Ch E 1 and Ch 9. Production of natural resins — rubber, shellac, rosin, gutta-percha, balata, amber, etc. Synthesis of typical thermoplastic materials — the cellulose compounds, styrene, acrylic, vinyl, and similar resins. Synthesis of phenolic, urea and melamine plastics. Synthetic rubbers — the neoprenes, bunas, thiokols, and butyl rubber. Flow sheets, chemical reactions, and equipment.
Vanderbilt Rubber Handbook, 1942 — Ball; and Plastics Catalog, 1944.

Ch E 32 RUBBER AND PLASTICS II—Product Manufacture. (5 plus 0) Credit 5.
Must be preceded by Ch E 31. Manufacture of commercial products from the resins. Solvents, plasticizers, fillers, and pigments. Transfer, compression, injection, jet, extrusion and cold molding. Preforming, casting. Low pressure and high pressure laminating. Coating and textile materials. Designing, finishing and decorating. Specifications and tests. Economics of the plastics industry.
Texts same as for Ch E 31.

CIVIL ENGINEERING

CE 1 PLANE SURVEYING. (3 plus 6) Credit 5.
Must be preceded by Trigonometry and Engineering Drawing I. Theory and principles; field book; theory of field notes; construction, care and use of level and transit; leveling and checking; profiling; compass surveying; methods of angle reading with transit traverse; computations of areas; errors of closure.
Principles and Practice of Surveying, Vol. I—Breed and Hosmer.
Laboratory Fee, Per Term, $3.00.

CE 2 ADVANCED SURVEYING. (3 plus 6) Credit 5.
Must be preceded by Plane Surveying. Continuation of Plane Surveying, Topographical Surveying; contours; mapping and theory of map scales; theory and methods of United States land surveys; and stadia surveying.
Same as Surveying I.
Laboratory Fee, Per Term, $3.00.

CE 3 GEOLOGY. (5 plus 0) Credit 5.
Must be preceded by English I. Physical, historical, and structural geology; **rocks and their relation to engineering work; rock-weathering and soil; control of rivers; relation of wave action and short currents to coasts and harbors; origin of lakes and swamps, and their relation to engineering work; landslides, land subsidence; glacial deposits; dams and reservoirs; road foundations and road materials.**
Geology and Engineering—Legget.

CE 10 MUNICIPAL ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by Plane Surveying. Sewerage and sewage disposal; water supply and purification; reservoirs and wells; materials and equipment.
Water Supply and Sewerage—Steel.

CE 11 RAILWAY AND HIGHWAY ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by Plane Surveying. Location surveys; vertical and horizontal curves; easement spirals; widening and superelevation for pavement and track curves; turnouts and crossings; switches and frogs; earthwork; construction and maintenance of pavements; costs. Problems; completed designs with drawings; field work.
Route Surveys—Rubey.

CE 12—HYDRAULICS. (5 plus 0) Credit 5.
Must be preceded by Physics 21, and Mathematics V. Units and notations; hydrostatics; theory of pressures; hydrokinetics; flow of water through conduits, weirs; nozzles and orifices.
Hydraulics—Schoder and Dawson.

CE 20 STRUCTURAL DESIGN I. (5 plus 0) Credit 5.
Must be preceded by Applied Mechanics I and Engineering Drawing I. Analysis of stresses, general theory of graphical determination of stresses; condition of equilibrium; moments; analysis of beams and simple framed structures; analysis of standard roof trusses including determination of member stresses under dead load, roof covering loads; wind and snow loads; design and analysis of roof systems; analysis of stresses in bents, towers, and similar structures; analysis of railroad bridges.
Theory of Simple Structures—Shedd and Vawter.

CE 21 STRUCTURAL DESIGN II. (5 plus 0) Credit 5.
Must be preceded by Structural Design I, Applied Mechanics II, and Strength of Materials I. Types of bridges; conditions of loading; stress analysis; computation of maximum and minimum stresses; design of plate girder bridge; design of roof truss; beams and columns. Complete drawings and tabulations of calculations.
Structural Design in Steel—Shedd.

CE 22 STRUCTURAL DESIGN III. (5 plus 0) Credit 5.
Must be preceded by Structural Design II. Continuation of Structural Design II. Design of highway bridge; design of railroad bridge. Complete drawings and tabulations of calculations.
Text same as for Structural Design II.

CE 30 CONCRETE I. (5 plus 0) Credit 5.
Must be preceded by Mathematics V and Strength of Materials I. Stresses in beams; bond; shear and web reinforcement; composite beams; columns.
Theory and Practice of Reinforced Concrete—Dunham.

CE 31 CONCRETE II. (5 plus 0) Credit 5.
Must be preceded by Concrete I. Columns under combined bending and direct stresses; retaining walls; foundations; slabs.
Text same as for Concrete I.

CE 32 CONCRETE III. (5 plus 0) Credit 5.
Must be preceded by Concrete II. Analysis of rigid frames; design of building frames; arches.
Text same as for Concrete II.

ELECTRICAL ENGINEERING

EE 3 DIRECT CURRENT CIRCUITS. (5 plus 0) Credit 5.
Must be preceded by Physics 11. Application of Ohm's Law and Kirchoff's Law; magnetic and electrostatic circuits; inductance; capacitance and condensers.
A Course in Electrical Engineering, Vol. I—Dawes.

EE 2A ELECTRICAL LABORATORY 2A. (0 plus 6) Credit 2.
Must be preceded or accompanied by Physics 11 and preceded or accompanied by Mathematics I. Laboratory procedure; report writing, engineering graphs; experiments in direct current circuits, magnetic and electrostatic circuits.
Tech Laboratory Instruction Sheets.
Laboratory Fee, Per Term, $3.00.

EE 4 DIRECT CURRENT MACHINES. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering 3. D.C. generators and motors, armature reaction, winding, commutation, rheostats, efficiency, heating and rating of machines, switches, relays, regulators, care and operation of machinery.
Text same as for Electrical Engineering 3.

EE 4A ELECTRICAL LABORATORY 4A. (0 plus 8) Credit 4.
Must be preceded by Electrical Engineering 2A and preceded or accompanied by Electrical Engineering 4. Laboratory experiments on direct current machinery.
Electrical Laboratory Experiments—Dennison.
Laboratory Fee, Per Term, $5.00.

EE 5 ALTERNATING CURRENT CIRCUITS. (5 plus 0) Credit 5.
Must be preceded or accompanied by Mathematics 5. Vector analysis of alternating current circuits; complex systems of notation; inductive and capacitive circuits, power factor, power measurements, single-phase and polyphase circuits.
Alternating Current Circuits—Bryant, Correll and Johnson.

EE 5A ELECTRICAL LABORATORY 5A. (1 plus 4) Credit 2.
Must be preceded or accompanied by Electrical Engineering 5. Laboratory experiments on single phase and polyphase alternating current circuits.
Text same as for Electrical Engineering 4A.
Laboratory Fee, Per Term, $3.00.

EE 6 ALTERNATING CURRENT MACHINES. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering 5. Single phase and polyphase synchronous machines, rectifying devices.
Alternating Current Machinery—Bryant and Johnson.

EE 6A ELECTRICAL LABORATORY 6A. (1 plus 4) Credit 2.
Must be preceded or accompanied by Electrical Engineering 6, and preceded by Electrical Engineering 5A. Laboratory experiments on synchronous A.C. machines.
Text same as for Electrical Engineering 4A.
Laboratory Fee, Per Term, $3.00.

EE 7 ALTERNATING CURRENT MACHINES. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering 5. Transformer connections. asynchronous machines.
Text same as for Electrical Engineering 6.

EE 7A ELECTRICAL LABORATORY 7A. (1 plus 4) Credit 2.
Must be preceded or accompanied by Electrical Engineering 7, and preceded by Electrical Engineering 5A. Experiments on transformers and asvnchronous machines.
Text same as for Electrical Engineering 4A.
Laboratory Fee, Per Term, $3.00.

EE 8A ELECTRICAL LABORATORY 8A. (1 plus 4) Credit 2.
Must be preceded by Electrical Engineering 6 and 7. Advanced experiments on alternating current machines.
Text same as for Electrical Engineering 7A.
Laboratory Fee, Per Term, $3.00.

EE 10—ELEMENTS OF ELECTRICAL ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by Physics 11. Fundamental A.C. and D.C. theory; D.C. generators, D.C. motors and their control; A.C. generators; A.C. motors and their application and control; transformers.
Electrical Engineering—Kimberly.

EE 21 ELECTRICAL DESIGN I. (0 plus 9) Credit 3.
Must be preceded or accompanied by Electrical Engineering V. Electrostatics. Design of insulators and condensers. Determination of capacities by dielectric flux plotting. Core and shell type distributing transformers, efficiency, heating and rating.
Elements of Electrical Design—Still.

EE 22 ELECTRICAL DESIGN II. (0 plus 9) Credit 3.
Design of direct current generator, armature, commutator, shunt and series field windings, commutating poles. Design and performance of polyphase induction motor.
Text same as for Electrical Design I.

EE 31 ELECTRONICS I. (3 plus 0) Credit 3.
Must be preceded by Physics 21 and Radio Engineering 2 or Electrical Engineering 5. The physics of electronics, electron tubes and their characteristics.
Engineering Electronics—Fink.

EE 32 ELECTRONICS II. (3 plus 6) Credit 3 or 5.
Must be preceded by Electrical Engineering 31. A study of the application of electron tubes in industry.
Text same as for Electrical Engineering 31.
Laboratory Fee, Per Term, $3.00.

EE 35 ELECTRIC POWER TRANSMISSION AND DISTRIBUTION. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering 6 and Radio Engineering 36. Economic principles of power transmission and distribution; distribution systems; conductors and supporting structures; power factor correction; protective devices.
Principles of Power Transmission and Distribution—Woodruff.

EE 36 ILLUMINATING ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering 5 and Mathematics 6. Lighting requirements, definitions and measurements; characteristics of light sources; system efficiency; light generators; visual effectiveness.
Lighting Calculations—Higbee.

EE 41 ELECTRICAL MEASUREMENTS. (2 plus 3) Credit 3.
Precise measurements of resistance, inductance, capacitance, current, e.m.f., flux density, hysteresis loss.
Electrical Measurements in Theory and Application—Smith.
Laboratory Fee, Per Term, $2.00.

EE 121 ELECTRICAL DESIGN. (2 plus 9) Credit 5.
Design of high voltage insulating bushing; design of synchronous motor or alternator.
Elements of Electrical Design—Still.

MECHANICAL ENGINEERING

ME 1 MACHINE SHOP I. (0 plus 6) Credit 2.
Operation of fundamental types of shop machines, such as the lathe, drill press, shaper and milling machine, and study of tool shapes and cutting speeds.
Machine Tool Work—Turner.
Laboratory Fee, Per Term, $3.00.

ME 2 MACHINE SHOP II. (0 plus 6) Credit 2.
To be preceded by Machine Shop I. Continuation of Machine Shop I.
Text same as for Machine Shop I.
Laboratory Fee, Per Term, $3.00.

ME 10 MECHANISM. (3 plus 6) Credit 5.
Must be preceded by Physics 21. A study of the motions of machine parts, and the design of machines without consideration of strength. Belting, cams, linkages, and gears.
Kinematics of Machines—Guillot.

ME 11 ELEMENTARY MACHINE DESIGN. (3 plus 6) Credit 5.
Must be preceded by Elements of Applied Mechanics, and accompanied by Elements of Strength of Materials. Design of simple machine parts.
Text to be selected.

ME 12 MACHINE DESIGN I. (5 plus 0) Credit 5.
Must be preceded by Mechanism and Applied Mechanics II and accompanied by Strength of Materials II. Engineering materials, selection of design stresses, stress analysis of machine parts, and design of machine part.
Design of Machine Members—Vallance.

ME 13 MACHINE DESIGN II. (2 plus 9) Credit 5.
Must be preceded by Machine Design I and Strength of Materials II. Design of complete machines, such as cranes and punch presses in which stresses are chiefly static.
Text same as for Machine Design I.

ME 14 MACHINE DESIGN III. (3 plus 6) Credit 5.
Must be preceded by Machine Design II. Analysis of dynamic stresses in high speed machinery; vibration and balancing problems.
Text to be selected.

ME 20 THERMODYNAMICS I. (5 plus 0) Credit 5.
Must be preceded by Physics 21 and accompanied by Mathematics V. Thermodynamics of gases; cycles and performance of compressed air machinery and internal combustion engines; combustion of fuels.
Applied Thermodynamics—Faires.

ME 21 THERMODYNAMICS II. (5 plus 0) Credit 5.
Must be preceded by Thermodynamics I. Thermodynamics of steam and other vapors; cycles and performance of steam power plants and auxiliary equipment; vapor refrigeration.
Applied Thermodynamics—Faires.

ME 30 INTERNAL COMBUSTION ENGINES. (5 plus 0) Credit 5.
Must be preceded by Thermodynamics I. A more thorough study of the ideal and actual cycles of internal combustion engines, including fuels, combustion, carburetion, injection, details of engine construction, lubrication, balancing and performance.
Internal Combustion Engines—Lichty.

ME 32 REFRIGERATION. (5 plus 0) Credit 5.
Must be accompanied by Thermodynamics II. The thermodynamics of compression and absorption refrigeration systems; refrigerants, commercial plants and equipment.
Refrigeration Engineering—MacIntyre.

ME 35 HEATING AND AIR CONDITIONING. (5 plus 0) Credit 5.
Must be preceded by Thermodynamics I. The loss of heat from buildings; steam and hot water and warm air heating systems; mechanical equipment of heating systems; theory and principles of air conditioning; methods and current practice.
Heating and Air Conditioning—Allen and Walker.

ME 38 STEAM POWER PLANTS. (5 plus 0) Credit 5.
Must be preceded by Thermodynamics II. Steam boilers, engines and turbines and the auxiliary equipment of steam power plants—their physical characteristics, operation, performance, efficiency and economy.
Steam Power Stations—Gaffert.

ME 40 INDUSTRIAL MANAGEMENT I. (5 plus 0) Credit 5.
For students having not less than 120 term hours' credit. Legal, financial and personnel structure of corporations; cost accounting; valuation, fixed charges and economic selection of equipment.
Business Administration for Engineers—Harding and Canfield.

ME 42 INDUSTRIAL RELATIONS (5 plus 0) Credit 5.
A study of management technique; application of psychological principles to human relations encountered in industry; personnel problems and public relations projects.
Psychology for Business and Industry — Moore.

ME 45 MECHANICAL ENGINEERING SEMINAR. (3 plus 0) Credit 5.
Last term only. Preparation of reports on selected items of current practice, events, developments and trends in Mechanical Engineering.
Technical Magazines and Reports of Engineering Society Meetings.

MECHANICAL DRAFTING

ED 1 ENGINEERING DRAWING I. (0 plus 6) Credit 2.
Use of instruments, engineering lettering, principles of orthographic projection.
Engineering Drawing—French.

ED 2 ENGINEERING DRAWING II. (0 plus 6) Credit 2.
Must be preceded by Engineering Drawing I. Working drawings, detail and assembly.
Text same as for Engineering Drawing I.

ED 3 ENGINEERING DRAWING III. (0 plus 6) Credit 2.
Must be preceded by Engineering Drawing II. Advanced drawing, conic sections, pictorial representation, structural and architectural engineering practice, charts and graphs.

ED 4 ENGINEERING DRAWING IV. (0 plus 6) Credit 2.
Must be preceded by Engineering Drawing III. Machine drawing; working drawings and assembly drawing of machine from field notes and sketches.

ED 5 TRACING. (0 plus 6) Credit 2.
Must be preceded by Engineering Drawing III. For Mechanical Drafting Course students only. Tracing of selected blue prints, to promote speed and accuracy.

ED 10 DESCRIPTIVE GEOMETRY. (0 plus 9) Credit 3.
Must be preceded by Plane Geometry and Engineering Drawing II. Representation of the point, the line, and the plane; orthographic and double orthographic prejection; bisecting planes; profile planes; fundamental problems of geometry of position.
Practical Descriptive Geometry—Smith.

RADIO ENGINEERING

RE 1 RADIO THEORY I. (3 plus 0) Credit 3.
Fundamentals of electricity for one-year radio course students. Ohms law, electrical power and energy, resistance measurement, shunts and multipliers.
Principles of Radio—Henney.

RE 2 RADIO THEORY II. (5 plus 0) Credit 5.
Must be preceded by Physics 11 and preceded or accompanied by Mathematics 2. Fundamentals of alternating current circuits; properties of coils and condensers; vacuum tube characteristics; the vacuum tube as an amplifier.
Text same as for Radio Theory I.

RE 2A RADIO LABORATORY 2A. (1 plus 3) Credit 2.
Must be accompanied or preceded by Radio Theory II. Laboratory experiments on inductance and capacity measurement; frequency measurements.
Manual of Radio Laboratory Experiments—Ankrum.
Laboratory Fee, Per Term, $3.00.

RE 3 RADIO THEORY III. (5 plus 0) Credit 5.
Must be preceded by Radio Theory II. Study and design of audio amplifiers; power amplifiers; vacuum tube oscillators; modulation; detection; rectifiers; transmitters; receiving systems; antennas and wave propagation.
Text same as for Radio Theory II.

RE 3A RADIO LABORATORY 3A. (1 plus 3) Credit 2.
Must be accompanied or preceded by Radio Theory III and preceded by Radio Laboratory 2A. Vacuum tube characteristics; vacuum tube voltmeters; receiving systems; transmitters; antennas.
Text same as for Radio Laboratory 2A.
Laboratory Fee, Per Term, $3.00.

RE 5 RADIO ENGINEERING I. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering V. An advanced course in the operation and theory of resonant and coupled circuits; fundamental properties of vacuum tubes and audio frequency amplifiers.
Principles of Radio Engineering—Glasgow.

RE 6 RADIO ENGINEERING II. (5 plus 0) Credit 5.
Must be preceded by Radio Engineering I. Continuation of Radio Engineering I. Radio frequency amplifiers for reception; class B and C amplifiers for transmission, oscillators, modulation, detection, radio receptors, antennas, wave propagation.
Text same as for Radio Engineering I.

RE 11 RADIO SHOP. (0 plus 6) Credit 2.
Must be preceded by Radio Theory III and Radio Laboratory 3A. Experiments designed to acquaint the student with the practical aspects of radio. Shop construction project and radio service practice.
Text same as for Radio Engineering 3A.
Laboratory Fee, Per Term, $4.00.

RE 15 ELECTRICAL COMMUNICATION SYSTEMS. (3 plus 0) Credit 3.
Must be preceded by Radio Theory III. History of electrical communication, exchange and toll service systems, telegraph systems including teletypewriter systems, inductive interference and plant protection, electronic applications in wire communication, carrier systems and wireless systems.
Electrical Communication—Albert.

RE 21 RADIO DESIGN. (1 plus 6) Credit 3.
Must be accompanied or preceded by Radio Engineering II. A practical course in the design of circuit components, equipment and apparatus.
Text to be selected.

RE 31 TELEVISION ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by Electrical Engineering 31. A comprehensive treatment of modern cathode-ray television covering the television system from camera to viewing screen.
Television Engineering—Fink.

RE 35—MEDIUM AND HIGH FREQUENCY CIRCUITS.
(3 plus 0.) Credit 3.
Must be preceded by Electrical Engineering 5. Analysis of alternating current circuits under wide ranges of frequency. Fourier analysis of non-sinusoidal wave forms; network theorems; resonance phenomena; bridge circuits; coupled circuits and impedance matching networks.
Communication Engineering—Everitt.

RE 36 TRANSMISSION LINES. (3 plus 0) Credit 3.
Must be preceded by Electrical Engineering 5. Propagation of alternating currents over short, medium and long lines. Loading, electrical filters and equalizing networks.
Text same as for Radio Engineering 35.

RE 41 RADIO FREQUENCY MEASUREMENTS I. (2 plus 8) Credit 4.
Must be preceded or accompanied by Radio Engineering II and Transmission Lines. Measurement of circuit constants at audio frequencies and radio frequencies. Measurement of frequency and antenna and transmission line measurements.
Radio Frequency Electrical Measurements—Brown.
Laboratory Fee, Per Term, $5.00.

RE 42 RADIO FREQUENCY MEASUREMENTS II. (2 plus 8) Credit 4.
Must be preceded or accompanied by Radio Engineering II and Transmission Lines. Electromagnetic wave measurements; measurement of electron tube coefficients and amplifier performance; measurement of electromotive force, current, power, wave form and modulation.
Test same as for Radio Engineering 41.
Laboratory Fee, Per Term, $5.00.

RE 45 ACOUSTICAL ENGINEERING. (5 plus 0) Credit 5.
Must be preceded by Physics 31 and Mathematics 6. Practical aspects of electro-acoustic equipment; microphones, telephone receivers and loud speakers. Acoustical measurements and design.
Elements of Acoustical Engineering—Olson.

RO 1, 2 and 3. CODE 1, 2 and 3. Credit 2 hours each.
Requirements 13, 18, and 22 words per minute respectively in transmission and reception of International Morse Code. Typewriter copying in Code 2 and 3.
Laboratory Fee, Per Term, $3.00. Not required of one-year course students.

RO 2M and 3M. CODE 2M and 3M. Credit 2 hours each.
Requirements 13 and 22 words per minute each in the transmission and reception of American Morse Code.

RO 4 PRINCIPLES OF RADIO OPERATION. (5 plus 0) Credit 5.
Must be preceded by Radio Theory III. A course especially designed for those who wish to pass Federal Communications Commission examinations.
Radio Operating Questions and Answers—Nilson and Hornung.
Federal Communications Commission Bulletins.

RO 5 RECEIVER ANALYSIS. (2 plus 9) Credit 5.
Must be preceded by Radio Theory III. Theory of operation and repair of radio receivers, including television receivers.
Principles of Radio Servicing—Hicks.
Laboratory Fee, Per Term, $4.00.

Departmental Directory of Students for 1943

Aeronautical Engineering

Ackerman, W. Knox ....Madrid, Spain
Alexander, L. Walter ....Illinois
Allen, Gordon C. ....Missouri
Angelone, Anthoy J. ....New York

Bacon, Argyl D. ....Indiana
Bailey, Jack Owen ....Illinois
Baker, Daren E. ....Ohio
Bartolomeo, Dante E. ....Massachusetts
Bauman, John R. ....Ohio
Bem, Jerome P. ....Rio Piedras, P. R.
Besecker, Richard D. ....Ohio
Blackburn, William E. ....Massachusetts
Blakeslee, Franklin P. ....Pennsylvania
Brown, Harold B. ....Illinois
Brown, Rodney C. ....Georgia
Bruner, Paul D. ....New York
Burk, J. Lee, Jr. ....Ohio
Burton, Robert O. ....Indiana

Cacciola, Charles A. ....New York
Cadungog, Victorio V. ....Cebu, P. I.
Cancler, Leonard C. ....Wisconsin
Carlton, Robert A.............Santurce, P. R.
Chruscz, Fred R. ....Pennsylvania
Colberg, Eitel ....Rio Piedras, P. R.
Coleman, Frank T. ....New York
Colman, William S.....................New York
Coney, Richard C. ....Louisiana
Corrigan, Leo. A. ....New Hampshire
Cotton, C. Bill ....Iowa
Croasdale, W. Herbert ....New Jersey
Cutlip, Wilford, Jr. ....Ohio
Cynamon, Nathan ....New York

D'Allura, Joseph A. ....New York
Davis, James P., Jr. ....Indiana
Davis, Norman L. ....Indiana
Di Bartolo, Santo S. ....New York
Dillon, Cornelius W. ....Ohio
Dillon, Neal ....Ohio
Dunn, Ralph J. ....Indiana

English, John R. ....Ohio
Everett, Earl E., Jr. ....Ohio
Flanigan, Roy E. ....Indiana
Forrest, Clarence L. ....Ohio
Foster, Gerald V. ....Ohio
Fought, Charles F. ....Indiana

Geiger, Robert E. ....Ohio
Gerber, John D. ....Indiana
Glasscock, James L. ....West Virginia
Grodson, Anthony G. ....Pennsylvania
Grose, Gordon G. ....Indiana

Haberkorn, Theodore E., Jr. ....Indiana
Hagerman, John R. ....Michigan
Hall, Wesley R. ....Ohio
Hallerman, John J. ....Tennessee
Harriman, Robert D. ....Ohio
Head, Henderson H., Jr. ....Virginia
Heaton, Clyde E. ....Ohio
Hollenberg, Harold O. ....Indiana
Hutchinson, Charles S. ....South Dakota
Hutchinson, John H. ....South Dakota

Jeppe, Robert S. ....Ohio
Jevas, Nickolas ....Ohio
Joers, Ralph H. ....Indiana
Jordan, William R. ....Ohio

Kemp, Robert A. ....North Carolina
Kitterman, Robert V. ....Indiana
Knight, Richard E. ....Indiana
Kolbe, Carl D. ....New Jersey
Kosinski, Joseph N. ....Massachusetts
Krebs, David A. ....Pennsylvania

Landefeld, James A. ....Pennsylvania
Lawrence, Alvin A. ....Connecticut
LeClair, Arthur J., Jr. ....New Hampshire
Livezey, Robert E. ....Ohio
Longenecker, J. Richard ....Ohio
Lopresti, Robert C. ....New York
Lower, Ralph C. ....Indiana
Loy, Franklin T. ....Ohio

Magnuson, Paul H. ....Indiana
Makinas, Steve ....New York
Manrow, John F. ....Indiana
Markoff, Nicholas ....Indiana
Millard, Thomas E. ....Illinois
Minard, James V. ....Indiana
Molinet, Mario E. ....Havana, Cuba
Mommer, Eugene J. ....Indiana

Mommer, Glenn W. ....Indiana
Motlowitz, Nicholas ....Massachusetts
Myers, Marvin S. ....Washington
Nagy, John E. ....West Virginia
Nims, Bruce K. ....Oklahoma
Pallitti, Roger J. ....Pennsylvania
Panzl, Arnold R., Jr. ....Michigan
Parks, Carl B. ....Ohio
Partin, Harry B. ....Kentucky
Pezl, Jack F. ....Wisconsin
Phillips, Richard L. ....Indiana
Piepenbrink, Paul E. ....Indiana
Pierce, Frederick ....Michigan
Pongracz, Albert F. ....Ohio
Postle, Robert S. ....Ohio
Pound, Claude P., Jr. ....Michigan
Pursiful, L. J., Jr. ....Kentucky
Racisz, Stanley F. ....New York
Rawlinson, Robert G. Washington, D. C.
Rivera, Francisco A. ....Santurce, P. R.
Rogers, Raymond F. ....Ohio
Ross, Thomas J. ....Pennsylvnia
Salisbury, Robert J. ....Kentucky
Schmid, Robert A. ....Indiana
Schmidt, Frederick H. ....New Jersey
Schock, Waldo H., Jr. ....Ohio
Schumacher, Paul W. ....Indiana
Simonis, Ronald K. ....Ohio
Skaff, Irving W. ....Massachusetts
Slater, Leland S. ....Virginia
Smallen, F. Parker ....Tennessee
Snodgrass, Romain F. ....Utah
Snyder, Gerald A. ....Pennsylvania
Snyder, Tomas L. ....Pennsylvania
Straner, Warren G. ....Pennsylvania
Steele, Paul E. ....Ohio
Steinmetz, Charles P. ....Pennsylvania
Stumbaugh, Delmar ....Ohio
Takei, William T. ....California
Tarzis, Anthony ....New York
Taylor, Donald K. ....Michigan
Thomas, Edward J. ....Ohio
Thomas, George T. ....Michigan
Thomas, Richard C. ....Virginia
Wagner, Creighton S. ....Michigan
Wagner, M. Douglas ....Virginia
Weber, James A. ....Indiana
Wegman, Walter A. ....Ohio
Werderich, Louis J. ....Michigan
Wilcox, Ralph P. ....New York
Williams, Arthur J. ....Ohio
Wilson, James M. ....Indiana
Wortman, Robert V. ....New Jersey
Yingling, Albert G. ....Ohio

Chemical Engineering

Aldridge, Charles L. ....Illinois
Aper, John R. ....Illinois
Arnold, James P. ....Ohio
Ayres, Daniel R. ....Indiana
Bockelman, Ronald W. ....Ohio
Brown, F. Wayne ....Indiana
Budde, Robert E. ....Indiana
Cohen, Albert S. ....New Jersey
Cowan, Robert T. ....Indiana
Dickman, John F. ....Illinois
Doehrman, Paul F. ....Indiana
Etter, Leonard R. ....Ohio
Fleming, James A. ....Indiana
Freimuth, Robert E. ....Indiana
Garrett, Floyd B. ....New York
Gibbs, Albert C. ....New York
Gross, Walter D. ....Indiana
Keller, Leland W. ....Ohio
King, Henry M. ....Texas
Lytle, Kenneth L. ....Indiana
Manotas, M. Antonio ....Columbus, S. A.
Martin, John N. ....West Virginia
Mesa, Antonio P. ....Cardenas, Cuba
Miyashiro, James ....Maui, Hawaii
Moehring, David H. ....Indiana
Napolitan, Diamond S. ....New York
Pax, James H. ....Ohio
Pierce, Robert B. ....West Virginia
Pontius, Frank E. ....Indiana
Querin, Fred ....Ohio
Quick, J. Robert ....Illinois
Schaefer, Herbert E. ....South Carolina
Sheak, John H. ....Indiana
Shreiner, Claude L. ....Ohio
Sinefis, Calvin G. ....Nevada
Snyder, Cleo D. ....Indiana
Sperko, Emil ....Pennsylvania
Squires, Darrell K. ....Indiana
Stanforth, Charles M. ....Ohio
Suthers, George I. ....Ohio
Taylor, T. Donald ....Michigan
Trubin, George L. ....New Jersey
Ulrich, Sanford S. ....Indiana
Unger, Harvey F. ....West Virginia
Watson, Frederick T. ....New Jersey
Wentland, Robert ....Indiana
Whitehurst, Marshall ....Indiana
Wilson, Devon A. ....Indiana
Woodsmall, J. Herbert ....Missouri
Zolman, Thomas E. ....Indiana

DIRECTORY OF STUDENTS, 1943

Civil Engineering

Aberillo, Patricio ....Leyto, P. I.
Aguila, Manuel del Guatemala City, C. A.
Amis, John C. ....Tennessee

Bateh, Audi, J. ....Ramallah, Pallestine
Becker, Karl F. ....Ohio
Bertoncin, Attilio D. ....Michigan
Blue, Charles W. ....Indiana
Bommelje, Cornelius ....Honolulu, Hawaii
Brenner, Sammie B. ....Kentucky

Chandler, Donald G. ....Indiana

Diamond, Louis ....Massachusetts
Diaz-Granados, Enrique A. ....
..............................Bella Vista, Panama

Estenoz, Luis E. ....Colon, Panama

Flory, Lawrence D. ....Indiana

Garcia, William ....Santurce, P. R.
Gleason, John H. ....Vermont

Harman, Raymon L. ....Indiana
Harmon, Elliott B. ....Michigan
Hess, James R. ....Ohio

Johnston, Ruth V. ....Indiana

Lanza, Hugh B. ....Bolivia, S. A.
Larson, Edward W. ....Connecticut

Manfredi, Eugene ....New York
Miranda, Luis B. ....Peru, S. A.
Moore, Gerald E. ....Ohio
Moreno, Rodrigo ....Panama City, C. A.

Neuroth, Edward C. ....Indiana
Norris, Frank ....Virginia

Pence, Michael S. ....New Jersey

Rabb, Kenneth W. ....North Carolina
Ruest, Lucien J. ....Massachusetts

Santa Maria, Enrique........Colombia, S. A.
Shriver, Hubert L. ....Ohio
Smith, Ruth B. ....Ohio
Spencer, John L. ....Pennsylvania
Swanson, Erwin O. ....Minnesota
Sweeney, Clarence J. ....Montana

Tichenor, Roger T. ....Kentucky
Tigges, Eugene L. ....Indiana

Velsor, Sidney ....Florida
Villafane, Carlos E............Santurce, P. R.

Wellington, Kelly C. ....Montana
Whidden, Robert A. ....Ohio
Wilkinson, Joseph F. ....Indiana
Woodbury, Alfred F. ....California

Ziemke, Edward E. ....Ohio
Zimmerman, Harry C. ....New York

Electrical Engineering

Arndt, Henry F., Jr. ....Michigan

Baldwin, Wm. J. ....Indiana
Belluomini, Edward S. ....Illinois
Blankenship, Donald E. ....Ohio
Bunch, R. Glenn ....Kentucky

Cline, Maurice D. ....Indiana
Coolidge, John E. ....Connecticut

Daniel, Harry K. ....Indiana
Devan, Vernon C. ....Pennsylvania
Deville, Richard E. ....Ohio
Devlin, Robert A. ....Indiana
Dillon, James R. ....Ohio
Drost, Tony ....Wisconsin

Fleming, Lowell Dean ....Indiana

George, Kermit H. ....Ohio
Green, Keith W. ....Indiana

Hall, Sherman B. ....Pennsylvania
Harding, Keith C. ....Pennsylvania
Hildebrandt, Erik T. ....Colorado
Hogan, John F. ....Pennsylvania

Jett, Nicholas J. ....Indiana

Kennison, Charles W. ....Indiana
Kulifay, Joseph J. ....Ohio

Kundert, Samuel E. ....Ohio

Laird, Donald E. ....Indiana
Landau, Robert M. ....Indiana
Leeper, Frank L. ....Illinois
Loffredo, Nicholas J. ....Massachusetts

Massoth, Warren K. ....Michigan
Molz, Robert A. ....California
McKibben, Warren E. ....New York

Post, Paul E. ....Indiana

Rodriquez, Jesus A. ....Santa Clara, Cuba

Shell, William B. ....Illinois
Smith, Louis Leon ....Kansas
Stevenson, James Donald ....California
Stomberg, Virgil H. ....Illinois

Timmons, Noah Lee ....Kentucky
Towns, Ronald E. ....New York

Urodzinski, Joseph V. ....New York

Valenchis, Leo J. ....New York
Van Tassell, Raymond E. ....Oregon

Wiggins, Donald Lee ....West Virginia
Wong, Dewey J. ....Ohio
Wulff, Gale B. ....Ohio

Mechanical Engineering

Abbey, Shirl C. .... Ohio
Andrews, William T. .... Indiana

Bade, Richard O. .... Indiana
Beard, Edmund E. .... Ohio
Beltran, Raul R. .... Camaguey, Cuba
Black, Dugald O. .... Pennsylvania
Bonnis, Stephen .... Pennsylvania
Brown, Warren D. .... Massachusetts
Brown, William R. .... Michigan
Broxon, Thomas K. .... Indiana

Callahan, Robert E. .... Maryland
Carlson, Henry W., Jr. .... Conneticut
Carpenter, A. Emmett .... Kansas
Carpenter, David J. .... New York
Chinworth, Richard B. .... Indiana
Collins, Seymour .... New York
Curry, James E. .... Illinois

Decker, Jack R. .... Ohio
Di Giorgio, Mario .... Rhode Island
Dittrich, Ralph T. .... Ohio
Dube, F. Rowland .... Massachusetts
Dziewisz, Joseph S. .... New York

Ellas, Richard G. .... Arkansas
Esslinger, Robert L. .... Illinois
Eure, Nathaniel L. .... Virginia

Ferretti, Peter P. .... Pennsylvania
Fillinger, Kenneth N. .... Ohio
Fletcher, Charles A. .... Ohio
Fletcher, James E. .... Indiana
Foley, Frank W. .... Illinois
Foote, Morrall A. .... Wyoming

Giordano, Albert J. .... New Jersey
Gonzales, Jose E. .... Rio Piedras, P. R.
Gottschalk, Donald E. .... Illinois
Grabon, Daniel S. .... New York
Gray, John W. .... Maine
Gundlach, Joseph J. .... Illinois
Gundlach, Theodore F. .... Illinois

Harriman, Charles E. .... Ohio
Hassbun, Michael S. .... El Salvador, C. A.
Heffley, Russell H., Jr. .... Pennsylvania
Hermosillo, Alfredo .... California
Hull, Dean Robert .... Indiana
Hunt, Benner E. .... New Jersey

Jackson, Homer E. .... Indiana
Jasinsky, Alan L. .... Ohio
Jensen, Gale F. .... Nebraska

Kinkela, Merle .... Pennsylvania
Krpal, Stanley F. .... Illinois
Ksiazak, Joseph J. .... Conneticut

Lahr, Richard .... Ohio
Lewis, Ray E. .... Ohio
Longbucco, James .... New York
Lower, Ralph C. .... Indiana

Meece, Linden L. .... Ohio
Mendin, Edgar J. .... Santurce, P. R.
Mesnard, Robert E. .... Ohio
Meyers, William R. .... New Jersey
Millard, Theodore A. .... Illinois
Miller, Kenneth A. .... Indiana
Miller, Lewis E. .... Indiana
Miller, Melvin F. .... Indiana
Muraski, John R., Jr. .... Illinois
Murphy, Robert D. .... Florida
McInerney, Augustine .... Connecticut
McNeely, Harold P. .... Indiana

Noblit, D. Welch .... Kentucky
Noll, George C. .... Ohio

Olivares, Alberto M..... Guantanamo, Cuba
Olson, Everett A. .... North Dakota
Ormond, Joseph G. .... New York

Pelon, Raymond .... Michigan
Pequignot, Robert W. .... Indiana
Pfaffenberger, Walter E. .... Indiana
Proctor, Leslie M. .... Minnesota

Quinn, Roland W. .... South Carolina

Ready, Don E. .... Nebraska
Rojas, Vicente V. .... Venezuela, S. A.
Ross, Albert O. .... Ohio

Saunders, Douglas .... Georgia
Schroeder, Gerald B. .... Ohio
Shaner, Joseph I. .... Indiana
Smaardyk, Abraham ....
.... Middleburg, Holland
Stoker, S. Vernon .... Ohio
Stuckey, Edward A. .... New York
Sunier, Richard E. .... Indiana
Sward, Forrest W. .... Illinois
Swigert, Lester T. .... Ohio

Thomas, Forrest D. .... Indiana
Thompson, Myron E. .... Indiana
Todd, Donald J. .... Michigan

Van Winkle, Don G. .... Ohio
Vick, Fred A. .... North Carolina

Walsh, Clifford E. .... Michigan
Wass, Charles D..... .... West Virginia
Westbrock, Adrian .... Ohio
Wisnieski, Frank C. .... Connecticut
Wolfe, Harold H. .... Ohio
Woodard, Kenneth S. .... Massachusetts

Young, Keith V. .... Indiana

Radio Engineering

Archer, Norman L. .... Indiana

Bennett, Clinton C. .... Maine
Bigelow, John F. .... Indiana
Black, Thomas .... Pennsylvania
Blaine, William E., Jr. .... Tennessee
Bolinger, Norman C. .... Arkansas
Brown, Roland Lee .... Ohio
Bumgardner, Donald O. .... Indiana

Carson, Ralph S. .... North Carolina
Clune, Elmer F. .... Ohio

Critton, J. Robert ....Indiana
Daigre, Montgomery S. ....Mississippi
Grossman, Jack ....Ontario, Canada
Hatch, John A. ....Washington
Hughes, Joe W. ....South Carolina
Jones, Eldred ....Indiana
Kanczuzewski, Walter A. ....Indiana
Kopp, Donald P. ....Iowa
Kraft, Derald H. ....Ohio
LoVerde, John E. ....Massachusetts
Marchant, Rollo M., Jr. ....Ohio
Maxwell, Robert S. ....Ohio
Montgomery, John W. ....South Dakota
Moore, Thomas O. ....Illinois
Morgan, Lawrence M. ....Michigan
MacMillan, Jerrold H. ....New Jersey
McClelland, Walter B. ....Illinois
McInerney, John F. ....Connecticut
Nally, Aaron B. ....Indiana
Natoli, Anthony ....Ohio
Nolan, Raymond V. ....West Virginia
Northway, A. Lee ....New York
Nye, Robert D. ....Ohio
Robinson, James C. ....Arkansas
Rogers, Edwin F. ....Indiana
Rogoski, John F. ....Tennessee
Schumacher, Vincent C. ....Ohio
Sheely, John E. ....Ohio
Sheese, Orland C. ....Indiana
Simmons, James R. ....Montana
Simmons, Maurice A. ....Indiana
Sommer, Robert D. ....Indiana
Trentman, Melvin J. ....Ohio
Vaughn, Robert V. ....Ohio
Voeller, Emmett E., Jr. ....Ohio
Voeller, Richard L. ....Ohio
Wilson, Wallace W. ....Alabama
Wood, Lawrence A. ....California

STATEMENT BY JOHN J. CATON

Dean, Chrysler Institute of Engineering

The students from Indiana Technical College are making the same progress in our graduate school as are the students from any other college of engineering. All students accepted for this graduate course realize that they are on one year's probation and if they do not make a high enough standing in their laboratory and class work, they are automatically dropped at the end of the first year. At the present moment, no Indiana Tech man has met such a fate while on the other hand it has been necessary to drop others.

There is but one explanation of this which means that the engineering fundamentals are taught as well at Indiana Tech as at any other college of engineering.

Honor Roll of Tech Men in the Armed Forces

Tribute is also tendered to the many whose names still remain unreported to us.

Albert, Ernest
Aldrich, Frederick H.
Allen, Gordon C.
Amspaugh, William G.
Angelone, Anthony J.
Ankrom, Charles W.
Anton, Joseph D.
Arakaki, Minoru
Arnold, James P.
Atkinson, Paul W.
Atwell, Ralph
Ayres, Daniel R.

Babyak, Andrew H.
Bacon, Argyl D.
Bailey, Jack O.
Bailey, Robert W.
Baker, Daren E.
Baker, John H. Jr.
Bant, Irving M.
Bartolomeo, Dante E.
Baumann, John R.
Becker, Karl F.
Belluomini, Edward S.
Beltran, Raul R.
Benninghoff, Robert I.
Bentley, Donald B.
Bidelot, Albert R.
Blackburn, William E.
Blaine, William E. Jr.
Blankenship, Donald E.
Bogart, Cloman D.
Bolinger, Norman C.
Boutwell, Howard C.
Bowers, Robert D.
Braungart, Robert K.
Brigham, Jex M.
Brown, Harold B.
Brown, Harry K.
Brown, John M.
Brown, Rodney C.
Brown, Roland L.
Brown, Wayne P.
Bruner, Paul Dever
Bruns, Ralph W.
Buckley, Robert L.
Buehler, Paul W.
Bumgardner, Donald O.
Bunch, Robert G.
Burke, William R.
Burns, Donald J.
Butler, George J.
Butt, Cecil W.
Byrn, Ernest E.

Cacciola, Charles A.
Callahan, Charles Q.
Campbell, George E.
Cardoza, Dudley V.
Carpenter, David J.
Chew, Charles W. Jr.
Chrucz, Fred R.
Cintron, Lewis G.
Cline, Maurice D.
Clune, Elmer F.
Coleman, Frank T.
Coney, Richard C.
Conley, Wilfred
Conn, John E.
Connell, Edwin B.
Cook, Edward A.
Corrigan, Leo A.
Critton, James R.
Crouse, Frederick T.
Crozier, William B.
Curtis, Watson

D'Allura, Joseph A.
Daniels, Kenneth H.
Devan, Vernon C.
DeVille, Richard E.
Diamond, Louis J.
DiBartolo, Santo S.
Diehl, Phillip L.
DiGiorgio, Mario
Dixon, Paul T.
Doeden, Gerald D.
Doehrman, Paul F.
Douglas, Emmett Jr.
Drews, Melvin A.
Driver, Edward A.
Dufour, Raynaldo A.
Dull, Virgil P.
Dunham, Robert L.
Dunseth, George
Durkes, Dale G.
Dziewisz, Joseph S.

Elwood, Francis E.
Enevoldson, William C.
English, John R.
Esarey, Sol E.
Essert, Antone H.
Everett, Earl E. Jr.

Fensler, William E.
Ferretti, Peter P.
Ferrin, Kenneth S.
Ferrucci, Edward A.
Finner, Ray H.
Fitzgibbon, George T.
Fletcher, Charles A.
Flinn, Philip A.
Flores, Pablo J.
Fontaine, Robert A.
Foos, William A.
Fought, Charles F.
Founds, Joseph W.
Frank, William
Freeman, Russel H.
Freimuth, Robert E.
French, Charles R.

Gaffney, Ralph L.
Galligan, Phillip K.
Garden, John G.
George, Kermit H.
Gerber, John D.
Gilleff, John
Gleason, John H.
Goeglein, Roy F.
Gonzales, Fernando
Gonzales, Hector
Good, Raymond S.
Goodfellow, Edwin W.
Gottschalk, Donald E.
Gowins, John F.
Grabon, Daniel S.
Gratts, Milford W.
Gray, John W.
Green, Harold H.
Green, Keith W.
Grossman, Jack
Groton, Richard W.
Grout, Leo R.

Hackleman, Thomas F.
Hall, James M.
Hall, Wesley R.
Hammett, Marshall T.
Harmon, Elliott B.

Harper, John W.
Harriman, Charles C.
Harrison, James W.
Hartle, Merle W.
Harvey, Winston S.
Hausman, Ernest E.
Hayes, David T.
Hayes, Virgil F.
Head, Henderson H.
Henderson, William B.
Heppeard, Chester, S.
Hermosillo, Alfredo
Hiley, Frederick S.
Hipskind, Glyndon S.
Hipskind, Jack P.
Hoerger, Dale W.
Holding, Donald W.
Holman, Virgil E.
Howard, Earl O.
Hubbel, Thomas J.
Hubeny, Charles R.
Huffman, Ward W.
Huntsinger, Rolland O.
Huskins, Samuel Jr.
Hutson, William A.

Iungerich, Stevan

Jamison, David F.
Jensen, Gale F.
Joers, Ralph H.
Johnson, R. Benny
Jones, Eldred Jr.
Jones, Harold E.
Jones, Thomas E.
Jones, William H.
Jordan, William R.

Kanczuzewski, Walter A.
Kapp, Bernard F.
Kapp, Lawrence F.
Keller, Leland W.
Kirk, Harold E.
Kitsmiller, Jack R.
Kitterman, Robert V.
Kittredge, George D.
Klinker, Darrel E.
Kraft, Derald H.
Kundert, Samuel E.

LaMar, Harry H.
Latson, Harold A.
Lazarski, Frank C.
Lester, Carl C.
Lewis, Fred Jr.
Lisy, Stanley
Lopresti, Robert C.
Lowe, Richard S.
Luenberger, Charles F.
Lustek, James A.

McCormick, Donald J.
McGee, John H.
McKibben, Warren E.
McKinney, Charles D.
McNown, Kenneth
MacInnes, James
Mahaney, Michael C.
Mahaney, Thomas J. Jr.
Mahler, Robert L.
Manrow, John F.
Markoff, Nicholas
Martinelli, Joseph S.

Mason, Kenneth C.
Massoth, Warren K.
Mayhew, Gordon W.
Meece, Linden L.
Mesnard, Robert E.
Mikula, Emil James
Miller, Donald L.
Miller, Warren C.
Miranda, Luis B.
Mitchell, Harvest B.
Moehring, David H.
Monroe, Louie Jr.
Moore, Donald M.
Moore, Gerald E.
Moore, Lee H.
Morisy, Paul J.
Moses, David J.

Nagy, John E.
Napolitan, Diamond S.
Natoli, Anthony
Nelson, Paul M.
Northway, Albert L.
Null, Cleveland L.
Oakes, Cecil R.

Ogden, William W.
O'Hara, Carl F.
Osborn, Harold C.

Page, Waldo M.
Panzl, Arnold R.
Parkins, Charles B.
Patterson, Robert H.
Pax, James H.
Pence, Michael S.
Persechino, James J.
Peterson, Lewis T.
Phillips, Richards L.
Pickerill, Henry S.
Piepenbrink, Paul E.
Prezbendowski, August
Pufahl, Erhard R.
Pugh, Clyde S.

Querin, Fred
Quinn, Roland W.

Quick, John D.
Rahrig, Luke N.
Rapp, Lawrence F.
Ready, Donald C.
Reber, John H.
Resl, Andrew J.
Richards, Charles L.
Richter, Francis J.
Ring, Bernard T.
Rogers, Edwin F.
Rogers, Raymond F.
Rogoski, John F.
Ross, David G.
Rottman, William J.
Ruddell, Albert E.
Ruff, Joseph Jr.

Salisbury, Robert J.
Schaefer, William C.
Schaffter, Raymond
Schilperoot, Arnold G.
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